LET US UNDERSTAND MATHEMATICS
CLASS 4

Harinder Mahajan

Former Research Scientist C

Delhi University

PREFACE

This is part of a series of books based on NCERT curriculum and research on teaching of mathematics for class 4. The focus here is on laying a foundation for further learning of mathematics and understanding of concepts and procedures. Accordingly concepts are presented by manipulatives, pictures, real world situations, spoken and written words and symbols. Automaticity (answering without thinking) of addition, multiplication, subtraction and division are emphasized. The teachers should provide more practice if necessary for mastery of the concepts, and procedures and use objects that are readily available or situations for exercises that are familiar to the children in the class.
Ample opportunities are provided for applications of mathematics to real world situations, reasoning, communication and problem solving. The schools that have mathematics labs should provide ample quantities of materials such as counters, tiles, geometrical models, tangram pieces, blocks, geoboards, dot papers, balances, fraction pieces, graphs, scissor, ropes. If the schools do not have labs, the children in class four may be provided with 3 sets of 10 rods of different thickness, a set tangram pieces, rope, building blocks, grids and dot paper.
Some activity sheets are provided that can be removed and used.

TABLE OF CONTENTS

UNIT 1

Number from 1,000 to 1,00,000

Review of numbers up to 1000

1. Read the following numbers:
   6, 9, 34, 47, 149, 150, 63
2. Write all the numbers in order from
   25 to 31
   308 to 312
   494 to 504
   789 to 794
3. Write the following numbers in figures:
   Forty seven
   Four
   Six hundred thirty four
   Eight hundred fifty six
   Seven hundred –
   Three hundred four –
4. Write the following numbers in words:
   6
   8
   46
   50
   487
   561
   709
   306
5. Write the following numbers (to be dictated by the teacher):
   3, 0, 57, 39, 267, 462, 999, 406, 108, 900
6. What comes just after the following numbers?
   47
   99
   578
   409
   589
   499
   999

7. What comes just before the following numbers?

36

50

100

490

500

1000

8. Compare the following numbers by writing >, <, or = on the line between numbers:

9 _____ 5

46 _____73

67 _____9

56 _____54

234 _____561

568 _____562

85 _____103

9. Arrange the following numbers from smallest to largest:

87, 62, 980

453, 789, 321

600, 783, 123, 604

10. Arrange the following numbers from largest to smallest:

69, 84, 32

456, 739, 241

67, 843, 498, 972

11. Expanded forms of some numbers are given below write the numbers against them.

6 Hundreds + 5 Tens + 2 Ones =

4 Hundreds + 0 Tens + 8 Ones =

9 Hundreds + 0 Tens + 0 Ones =

12. Write the following numbers in expanded form:

583 = ___Hundreds + ___ Tens + ___ Ones

958 = ___Hundreds + ___ Tens + ___ Ones

807 = ___Hundreds + ___ Tens + ___ Ones

600 = ___Hundreds + ___ Tens + ___ Ones

13. Write the place value of the underlined digit in the following numbers:

4<u>7</u>

5<u>8</u>3

69<u>3</u>

4<u>0</u>6

Four digit numbers

We have learnt to write all numbers from 1 to 999. Recall that the numbers in order increase by 1.We use only digits from 0-9 and more places for larger numbers. When do we need another place?

The largest one-digit number is 9 and 1 more than 9 is 10 and requires two places one's place and ten's place.

The largest two-digit number is 99 and 1 more than 99 is 100 and requires three places- one's place, ten's place and hundred's place.

What is the largest three-digit number? (999)

The next number 1 more than 999 requires another place and name for that place. It is called a **thousand's place** and is written to the left of hundred's place. The number that comes just after 999 is 1000. The numbers that come after 1000 in order are 1001, 1002, 1003, 1004, and so on.

Reading four-digit numbers

We add a comma after the thousand's number e.g. 4,273. The number before the comma 4 in this case tells us about the thousands. We read the number as 4 thousand followed by the name of three digit number together. Thus the number 4,273 would be read as four thousand two hundred seventy three. Similarly, we would read 3,824 as three thousand eight hundred twenty four; 9,270 as nine thousand two hundred seventy; 3,201 as three thousand two hundred one. If the number of hundreds is zero as in 9,063, we read it as nine thousand sixty three. If the number of both hundreds and tens is zero as in 4,007, we read it as four thousand seven

Writing four digit numbers given in words in figures

If the numbers are given in words, we proceed as follows to write them in figures:

1. If the number has only thousands, say seven thousand, we write 7 followed by a comma and then three zeros that is 7,000.
2. If the number has thousands and hundreds only. We first write the digit for number of thousand's followed by a comma and then the digit for number of hundreds followed by two zeros. For example, we write eight thousand two hundred in figures as 8,200.
3. If the number has thousands, hundreds, tens and ones, we first write the digit for number of thousand's followed by a comma, then the digit for number of hundreds, then two-digit number. For example, we write four thousand three hundred seventy six in figures as 4,376.
4. If the number has thousands and two-digit number but no hundreds, we write 0 in the hundred's place. For example, we write seven thousand forty three in figures as 7,043.

5. If the number has thousands, hundreds and ones but no tens, we write 0 in the ten's place. For example, we write nine thousand six hundred four in figures as 9,604.
6. If the number has thousands and ones only, we write 0 in hundred's as well as ten's place. For example, we write six thousand one in figures as 6,001.

Note that all numbers from one thousand up to nine thousand nine hundred ninety nine should have four digits, some of which except the first one may be zeros.

Expanded form of four-digit numbers

Expanded form of four-digit numbers can be written in a manner similar to three-digit numbers by including number of thousands in the beginning e.g.
4,763 = 4 thousands + 7 hundreds + 6 tens + 3 ones
5,708 = 5 thousands + 7 hundreds + 0 tens + 8 ones
8,024 = 8 thousands + 0 hundreds + 2 tens + 4 ones
9,007 = 9 thousands + 0 hundreds + 0 tens + 7 ones
8,000 = 8 thousands + 0 hundreds + 0 tens + 0 ones
We can also make a **place value chart for writing four-digit numbers** e.g. 4,763, 5,708, 8,024, 9,007, 8,000.

Thousands	Hundreds	Tens	Ones
4	7	6	3
5	7	0	8
8	0	2	4
9	0	0	7
8	0	0	0

The first row gives the names of **places of different digits**.
The **place values of different digits** depend on its place.
Place value of a digit in a one's place is as many ones as the digit.
Place value of a digit in a ten's place is as many tens as the digit.
Place value of a digit in a hundred's place is as many hundreds as the digit.
Place value of a digit in a thousand's place is as many thousands as the digit.
For example for the number 4,763
3 is in one's place, its place value is 3
6 is in ten's place, its place value is 6 tens = 60
7 in hundred's place, its place value is 7 hundreds = 700
and 4 in thousand's place, its place value is 4 thousands = 4000.

Practice with writing in a place value chart is helpful for writing four digit numbers as it draws our attention to use of 0 as a placeholder if there are no ones, tens, or hundreds.

Exercise 1.1

1. Read the following numbers:
   467; 703; 270; 1,000, 4,667; 2,578; 1706; 1089, 6,980 and 4,005.
2. Make a place value chart and write the numbers in the chart (to be dictated by the teacher).
   (a) 7,492   (b) 5,791   (c) 1,803   (d) 3,765   (e) 3,089
   (f) 4,008   (g) 789,   (h) 903   (i) 4,082   (j) 5006
3. Write the following numbers in figures:
   (a) Seven hundred forty three
   (b) Six hundred eight
   (c) Four thousand
   (d) Three thousand seven hundred fifty seven
   (e) Eight thousand three hundred sixty four
   (f) Two thousand four hundred six
   (g) Nine thousand nine
   (h) Seven thousand eighty five
   (i) Three thousand one
   (j) One thousand seven hundred eight
4. Write the following numbers in words:
   (a) 67   (b) 853   (c) 702   (d) 2,894   (e) 9,704
   (f) 6009 (g) 8,056 (h) 1,890   (i) 7,052   (j) 4,005
5. What comes just after the following numbers?
   (a) 1,005   (b) 6734   (c) 9999   (d) 2009   (e) 999
6. What comes just before the following numbers?
   (a) 500   (b) 4,687   (c) 2,000   (d) 3,260   (e) 4,500
7. Write the numbers whose expanded forms are given below:
   (a) 4 Thousands + 3 Hundreds + 2 Tens + 7 Ones
   (b) 8 Thousands + 7 Hundreds + 0 Tens + 5 Ones
   (c) 3 Thousands + 0 Hundreds + 4 Tens + 0 Ones
   (d) 9 Thousands + 5 Hundreds + 0 Tens + 6 Ones
   (e) 2 Thousands + 6 Hundreds + 9 Tens + 0 Ones
8. Write the expanded forms of the numbers given below:
   (a) 6,952   (b) 8,478   (c) 5,089   (d) 6,703   (e) 4002
9. Fill in the blanks:
   (a) 500 +40 +8=
   (b).7000 + 600 + 30 + 4 =
   (c) 8000 + 40 +3 =
   (d) 9000 + 8 =

10. Name the digit in specified place for the following numbers:
    (a) One's place for the number 1,980
    (b) Thousand's 6,871
    (c) Hundred's place for the number 8,453
    (d) Ten's place for the number 5,672
11. Write the place value of the underlined digit in the following numbers:
    (a) 6,3<u>8</u>7   (b) 8,65<u>4</u>   (c) <u>2</u>,483   (d) 7,<u>4</u>69   (e) <u>8</u>,462
    (f) 5,8<u>0</u>4   (g) <u>1</u>,964   (h) 4,<u>8</u>26   (i) <u>3</u>,659   (j) 78<u>0</u>
12. Write numbers whose digits in different places have the following values:
    (a) Digit in hundred's place is 7, digit in ten's place is 1 and digit in one's place is zero
    (b) Digit in thousand's place is 8, digit in hundred's place is 0, digit in ten's place is 7 and digit in one's place is eight

7

Five digit numbers
The largest four-digit number is 9,999, and next number is 10,000, it requires one more place to the left of thousands place, which is called **ten thousands' place.**
Reading five-digit numbers
The ten thousand's number is written before the thousand's number e.g. 25,687. The number before the comma 25 in this case also tells us about the thousands and the two digits are read together as twenty five thousand followed by the number as in four-digit numbers. This number would thus be read as twenty five thousand six hundred eighty seven. Similarly we would read 53,864 as fifty three thousand eight hundred sixty four, 30,276 as thirty thousand two hundred seventy six; 94,048 as ninety four thousand forty eight; 60,003 as sixty thousand three and 40,050 as forty thousand fifty.
Writing five digit numbers given in words in figures
We write these as four-digit numbers except that we write for the thousands two-digits instead of one digit. For example, we would write the numbers given below as follows:
Forty thousand-40,000
Twenty three thousand five hundred sixty four-23,564
Seventy thousand nine hundred twelve-70,912
Eighty thousand forty-80,040
Sixty thousand four-60,004

Make sure that all numbers from 10,000 up to 99,999 should have five digits, some of which except the first one may be zeros.

Expanded form of five-digit numbers

Expanded form of five-digit numbers can be written in a manner similar to four-digit numbers by including number of ten thousands in the beginning e.g.
24,687 = 2 ten thousands + 4 thousands + 6 hundreds + 8 tens + 7 ones
53,864 = 5 ten thousands + 3 thousands + 8 hundreds + 6 tens + 4 ones
19,695 = 1 ten thousands + 9 thousands + 6 hundreds + 9 tens + 5 ones
30,276 = 3 ten thousands + 0 thousands + 2 hundreds + 7 tens + 6 ones
94,048 = 9 ten thousands + 4 thousands + 0 hundreds + 4 tens + 8 ones
60,003 = 6 ten thousands + 0 thousands + 0 hundreds + 0 tens + 3 ones
40,050 = 4 ten thousands + 0 thousands + 0 hundreds + 5 tens + 0 ones

We can also make a **place value chart for writing five-digit numbers** by including a column of ten thousands before the thousand column. The numbers 24,687; 53,864; 19,695; 30,276; 94,048; 60,003 and 40,050 may be written in this chart as follows:

Ten thousands	Thousands	Hundreds	Tens	Ones
2	4	6	8	7
5	3	8	6	4
1	9	6	9	5
3	0	2	7	6
9	4	0	4	8
6	0	0	0	3
4	0	0	5	0

Note that place value chart is another ways of writing expanded form of writing five digit numbers. Henceforth we will use place value chart only as it is more compact. Practice first writing five digit numbers in a place value chart as it draws attention to use of 0 as a placeholder if there are no ones, tens, hundreds or thousands.

Exercise 1.2

1. Read the following numbers:
   1,089, 6,980; 4,005; 24,589; 53,607; 84,790, 40,693; 70,068; 50,000; 16,005; 60,761

2. Make a place value chart for writing five-digit numbers and write these numbers in it (to be dictated by the teacher)
   (a) 35,892   (b) 24,701   (c) 67,089   (d) 84,005   (e) 56,000
   (f) 48,007   (g) 96,806   (h) 5,789   (i) 12,984   (j) 72,064

3. Write the following numbers in figures:
   (a) Twenty five thousand four hundred sixty seven
   (b) Forty three thousand six hundred ninety five
   (c) Sixty thousand two hundred forty seven
   (d) Thirty three thousand seventy five
   (e) Fifty eight thousand four hundred five
   (f) Eighty thousand seven
   (g) Ninety thousand -

4. Write the following numbers in words:
   (a) 78,583   (b) 14,851   (c) 67,908   (d) 54,064   (e) 48,007
   (f) 30,000   (g) 70,005   (h) 24,006   (i) 14,078   (j) 50,786

5. What comes just after the following numbers?
   (a) 24,000   (b) 56719   (c) 43499
   (d) 64,999   (e) 39,999   (f) 56,847

6. What comes just before the following numbers?
   (a) 100   (b) 45,675   (c) 78,780
   (d) 66,800   (e) 34,000   (f)50,000

7. Write the name of the digit in specified place for the following numbers:
   (a) Ten's place for the number 25,687
   (b) One's place for the number 15,398
   (c) Thousand's place for the number 56,587
   (d) Hundred's place for the number 48,465
   (e) Ten thousand's place for the number 73,892

8. Write the place value of the underlined digit in the following numbers:
   (a) 46,893   (b) 69,094   (c) 28,953
   (d) 70,882   (e) 58,349   (f) 94,827
   (g) 14,695   (h) 23,741   (i) 56,804

Six digit numbers

We can similarly write numbers with more than five digits if we know the name of the places to the left of known numbers.

What is the largest five-digit number? (99999)

What is 1 more than 99999 (a six digit number).

It requires one more place to the left of ten thousands place, which is called a **lakh's place.** It has a place value ten times of the place value of ten thousand's place. We add a comma after a lakh's place. Examples of six digit numbers are 4,56,789; 2,67,563; 6,84,708; 8,92,390; 5,73,006; 1,06,256 and 1,00,453.

Reading six-digit numbers

When a big number has two commas e.g. 4,56,789 the number in front of first comma 4 in this case tells us about the lakhs. The number is read as 4 lakh followed by reading the five digit number, in this example four lakh fifty six thousand seven hundred eighty nine. Similarly, we would read the other numbers as follows:

2,67,563 - two lakh sixty seven thousand five hundred sixty three

6,84,708 - six lakh eighty four thousand seven hundred eight

8,92,390 - eight lakh ninety two thousand three hundred ninety

5,73,006 - five lakh seventy three thousand six

1,06,256 - one lakh six thousand two hundred fifty six

1,00,453 - one lakh four hundred fifty three

Writing six-digit numbers given in words in figures

We begin these with a digit denoting the lakhs followed by a comma before the five-digit number. For example, we would write the numbers given below as follows:

One lakh-1,00,000

Three lakh-3,00,000

Five lakh twenty seven thousand two hundred fifty nine-5,27,259

Eight lakh thirty thousand four hundred thirty six-8,30,436

Two lakh 4 thousand two hundred eight-2,04,208

Seven lakh nineteen-7,00,019

Make sure that all numbers from 1,00,000 up to 9,99,999 should have six digits, some of which except the first one may be zeros.

A place value chart for writing six-digit numbers can be made by including a column of lakhs before the ten thousands column. The numbers 2,67,563; 6,84,708; 8,92,390; 5,73,006; 1,06,256 and 1,00,453 may be written in this chart as follows:

Lakhs	Ten thousands	Thousands	Hundreds	Tens	Ones
2	6	7	5	6	3
6	8	4	7	0	8
8	9	2	3	9	0
5	7	3	0	0	6
1	0	6	2	5	6
1	0	0	4	5	3

Practice with writing in place value chart is helpful for writing six digit numbers especially when given orally and tells us to use 0 as a placeholder if there are no ten thousands, thousands, hundreds, tens or ones till you have mastery. Numbers with fewer than six digits can be written in a place value chart for a number using the appropriate number of columns.

Some generalizations about numbers

1. Numbers increase in order by 1.
2. Any number however large can be written using digits 0-9 by using the concept of place value.
3. We need another place for the next number when all the digits in a number are 9. That place is given a name and added to the left of the existing places.
4. Any place always has a place value ten times the place value of the place next to its right.

Exercise 1.3

1. Read the following numbers:
   5,7047; 4,073; 3,50,642; 6,72,056; 1,80,006; 5,67,009.
2. Make a place value chart for 6-digit numbers and write these numbers in a place value chart (to be dictated by the teacher):
   (a) 3,47,289   (b) 2,45,392   (c) 8,00,562
   (d) 7,82,005   (e) 4,50,006   (f) 5,00,004
3. Write the following numbers in figures:
   (a) Sixty thousand three hundred forty seven –
   (b) Two lakh thirty five thousand eight hundred thirty four
   (c) Five lakh seven thousand four hundred six
   (d) Seven lakh forty two thousand ninety three .
   (e) Eight lakh nine
   (f) Three lakh four hundred one
   (g) Nine lakh thirty thousand two hundred four
4. Write the following numbers in words:
   (a) 4,75,973
   (b) 5,67,805
   (c) 7,04,890
   (d) 3,80,063
   (e) 9,99,999
   (f) 3,00,006
   (g) 2,00,000
5. Write the place value of the underlined digit in the following numbers:
   (a) 6,8̲4,902   (b) 5̲,78,296   (c) 8,90,7̲61
   (d) 6,4̲6,835   (e) 6,20,47̲3   (f) 9,64,07̲0
6. Write three numbers that lie between
   (a) 40 and 50
   (b) 560 and 570
   (c) 6,270 and 6,280
   (d) 100 and 200
   (e) 6,780 and 6,790
   (f) 5,700 and 5,800
   (g) 3,000 and 4,000
   (h) 58,000 and 59,000
   (i) 4,72,000 and 4,73,000
7. Give examples of situations in daily life where you find
   (a) One-digit numbers

(b) Two-digit numbers
(c) Three-digit numbers
(d) Four-digit numbers
(e) Five-digit numbers
(f) Six-digit numbers

8. Visit a toy or stationery or any other shop or post office and write uses of numbers that you find there and present it in class.

Comparison of numbers

You may recall that the digits in different places have different values. The first digit on the right is in one's place has the value 1 and its value is the same as the digit. The digit on its left is in ten's place has the value 10 and its value is as many tens. The digit to the digit on left of ten's place is in hundred's place has the value 100 and its value is as many hundreds and so on. The number is equal to the sum of all these values. We can compare numbers by either remembering the number that came earlier in counting is less than the number that came later in counting or by looking at the digits. If the number of digits is different in the two numbers, the number with larger number of digits is greater than the one that has fewer digits, for example, 45 > 8, 674 > 89, 5234 > 687, 25,781 > 8,629, 1,67,903 > 98,528. If the two numbers have the same number of digits, we first look at the digit in the place with highest value or leftmost digits in the two numbers, if these are different than the number in which this digit is larger is greater than the number in which digit in that place is smaller. For example, 456 > 278 or 278 < 456, 7835 > 6839 or 6839 < 7835, 56,982 > 40,789 or 40789 < 56,982, 4,56,891 > 2,89,461 or 2,89,461 < 4,56,891.
If the digits in this place are the same in both the numbers, then we compare the digits in the next place. If these are different the number in which digit in this place is larger is greater than the number in which digit in this place is smaller, for example, 247 > 228 or 228 < 247, 7478 > 7259 or 7259 < 7478, 45,789 > 42,986 or 42,986 < 45,789.
If the digit in the leftmost place as well as the place adjacent to it are the same the same in both the numbers, then we compare the digits in the next place. If these are different the number in which digit in that place is larger is greater than the number in which digit in that place is smaller for example, 783 > 782 or 782 < 783, 9437 > 9419 or 9419 < 9437, 56,984 > 56,789 or 56,789 <56,984. If the numbers have more than two-digits beginning from the left the same consider the digits in the same place that are different the one with larger value is larger than the other. If the digits in all places are the same in both the numbers, then the two numbers are equal, for example, 658 = 658, 7,495 = 7,495, 23,467 = 23,467.

Exercise 1.4

1. Compare the following numbers by writing >, <, or = between numbers:
    (a) 678 _____ 89
    (b) 2,457 _____793
    (c) 4,569 _____4,584
    (d) 78,952 _____63,763
    (e) 48,649 _____48,798
2. Arrange the following numbers from smallest to largest:
    (a) 25, 67 and 30
    (b) 462   8,73   760
    (c) 546   8,531 4,906
    (d) 4,785 4,794 34,762
3. Arrange the following numbers from largest to smallest:
    (a) 58   78   23
    (b) 567   349   782
    (c) 9,432   25,873   45,982
    (d) 67,413   85,329   85,964
4. Write the smallest four-digit number
5. Write the largest five-digit number
6. Write the smallest number using digits 3,9,2. Use each digit once only.
7. Write the largest number using digits 4,8,5,2. Use each digit once only.
8. Write all the numbers using digits 4, 2 and 9
9. Write all the numbers using digits 5, 1,and 0

UNIT 2

Addition and subtraction of four and five-digit numbers

Addition

Four-digit numbers can be added in a manner similar to three-digit numbers. From now on we will use the short algorithm only.

Recall to add three-digit numbers, we

1. Write the numbers in a vertical column so that one's place, ten's place and hundred's place of all the numbers are aligned. Draw a line for writing the sum below that
2. Add the ones. If the number of ones is less than 10, write it in one's place for the sum. If the number of ones is 10 or more, regroup these to tens and ones. Write ones in one's place for the sum and tens in the ten's place above the numbers to remind you that these are to be added while adding the tens.
3. Add the tens. If the number of tens is less than 10, write it in ten's place for the sum. If the number of tens is 10 or more regroup tens to hundreds and tens and write the tens in ten's place for the sum and hundreds in hundred's place above the numbers.
4. Add the hundreds. If the number of hundreds is less than 10, write it in hundred's place for the sum. If the sum of hundreds is 10 or more than 10, regroup the sum of hundreds to thousands and hundreds and write these in hundred's and thousand's place in the sum.

   Example 1

   ```
    H T O
     1 1
     3 7 2
     2 5 6
   +3 5 8
   --------
     9 8 6
   --------
   ```

1. Add the ones first that gives 16.
2. Regroup it as one ten and 6 ones; write 6 in one's place and 1 above the numbers in ten's place to remind us another ten is to be added while adding the tens.

3. Add the tens which give 18 tens. Regroup it as 1 hundred and 8 tens, write 8 in ten's place and 1 above the numbers in hundred's place to remind us another hundred is to be added while adding the hundreds
4. Add the hundreds, which give 9. Therefore, the sum is 986.

Addition of four digit numbers

The procedure for addition of four-digit numbers is similar except for an additional step of addition of thousands. To add four-digit numbers

1. Write the numbers so that one's place, ten's place, hundred's place, and thousand's place of all the numbers are aligned. Draw a line below that to write the sum.
2. Add and regroup up to hundreds as for 3-digit numbers. If the sum of hundreds is less than 10 write in hundred's place for the sum. If sum of hundreds is more than ten regroup it as thousands and hundreds Write the hundreds in hundred's place in the sum and thousands above thousand's place to remind us to add it while adding the thousands
3. Add the thousands. If the sum of thousands is less than ten, write it in thousand's place in the sum. If the sum of thousands is more than ten, regroup it to ten thousands and thousands and write the thousand in thousand's place and ten thousands in the ten thousand's place in the sum.

Example 2

```
  1 1 1
  3,467
+ 4,678
--------
  8,145
```
----

1. Adding the ones, we have 15 ones. As it is more than 10, we regroup it as 1 ten and 4 ones. Write the 5 in one's column in the sum and 1 in ten's column above the numbers.
2. Adding the tens, we have 14 tens. As it is more than 10, we regroup it as 1 hundred and 4 tens. Write the 4 in ten's column in the sum and 1 in hundred's column above the numbers.
3. Adding the hundreds, we have 11 hundreds. As it is more than 10, we regroup it as 1 thousand and 1 hundred. Write the 1 in hundred's column in the sum and 1 in thousand in thousand's column above the numbers.
4. Adding the thousands we have 8 thousands and write 8 in thousand's column in the sum.

For adding numbers with different digits remember to align the numbers on the right.

18

Example 3
```
  1 1
 2,592
+  735
--------
 3,327
--------
```

Exercise 3.1

1. Fill in the blanks:

   15 Hundreds = ____Thousands + ___ Hundreds

   10 Hundreds = ____Thousands + ___ Hundreds

2. Write the numbers given below in vertical form for addition so that different places e.g. one's place, ten's place, hundred's place, thousand's place and ten thousand's place of all the numbers are aligned and add them.

   12356   7

   56 475   2,835

   34 659   2,432

3. **Add**

Th H T O	Th H T O	Th H T O
3, 5 4 8	4, 2 0 7	5, 5 4 7
+4, 4 3 1	+4, 5 8 2	2, 1.0 3
		+1, 8 0 6
----------	----------	---------
----------	----------	---------

6, 2 5 7	4, 4 4 3	6, 5 4 7
+2, 4 4 4	+2, 4 6 8	+2, 3 3 1
----------	----------	----------
----------	----------	----------

3, 6 5 3	4, 6 4 6	7, 5 2 4
+4, 3 8 9	+3, 2 8 7	+1, 2 6 9
----------	----------	----------
----------	----------	----------

5, 5 4 7	3 4 5 6	7, 3 5 8
+2, 5 6 8	+3 8 7 8	+1, 5 4 2
----------	----------	----------
----------	----------	----------

Addition of five digit numbers

The procedure for addition of five-digit numbers is similar manner with an additional step of addition of ten thousands. To add five-digit numbers

1. Write the numbers so that one's place, ten's place, hundred's place, thousand's place and ten thousand's place of all the numbers are aligned. Draw a line below that to write the sum.
2. Add and regroup up to thousands as for 4-digit numbers. If the sum of thousands is less than 10 write in thousand's place for the sum. If sum of thousands is more than ten regroup it as ten thousands and thousands Write the thousands in thousand's place in the sum and ten thousands above ten thousand to remind us to add it while adding the ten thousands
3. Add ten thousands. If the sum of ten thousands is less than 10 write it in ten thousand's place. If the sum of ten thousands is more than ten, regroup it as lakhs and ten thousands. Write the ten thousands in ten thousand's place and lakhs in lakh's place in the sum.

Example 4

```
    1 1  1
   35,782
 + 57,423
 -----------
   93,205
 -----------
```

1. Adding the ones, we have 5 ones. As it is less than 10 we write the 5 in one's column in the sum.
2. Adding the tens, we have 10 tens. As it is equal to 10, we regroup it as 1 hundred and 0 tens. Write the 0 in ten's column in the sum and 1 in hundred's column above the numbers.
3. Adding the hundreds, we have 12 hundreds. As it is more than 10, we regroup it as 1 thousand and 2 hundreds. Write the 2 in hundred's column in the sum and 1 in thousand in thousand's column above the numbers.
4. Adding the thousands we have 13 thousands. As it is more than 10, we regroup it as 1 ten thousand and 3 thousands. Write 3 in thousand's column in the sum and 1 in ten thousand's column above the numbers in ten thousand's column.
5. Adding the ten thousands, we have 9 ten thousands and write it in ten thousand's column in the sum.

Example 5

```
    1 1  2 1
    56,784
  2,67,357
```

21

```
 +     772
 --------------
   3,24,913
 --------------
```

Verify the examples given below:

```
   1                    1  11                  1 1  1
  47,482               63,594                 72,573
 +32,279              +52,758                + 7,846
 ----------            ----------              ----------
  79,761              1,16,352                 80,419
 ----------            ----------              ----------
```

Verifying answers

We can check the answers by doing it again. However, we may commit the same mistakes again. It is desirable to check the answers by methods that require other facts or operations.

We can check **addition of three numbers** by adding numbers up and down.

Exercise 3.2

1. Fill in the blanks:
   20 Thousands = ____Ten Thousands ____Thousands
   10 Ten Thousands = ____Lakhs + ____ Ten Thousands
   12 Ten Thousands = ____Lakhs + ____ Ten Thousands

2. Write the numbers given below in vertical form for addition so that different places e.g. one's place, ten's place, hundred's place, thousand's place and ten thousand's place of all the numbers are aligned and add them.

23	5,623	17,617
5	4,753	52,835
134	2,659	36,432

3. Add

```
                      4 2, 6 7 3                  7 7, 3 4 2
    4 3, 5 4 8        2 5, 5 1 7                   1, 4 3 8
 +  4 2, 3 7 7     +          6 8             +          2 0 4
 ----------------   ----------------          ----------------


 ----------------   ----------------          ----------------


    2 6, 1 8 7        5 4, 4 2 4                  5 3, 6 6 2
    4 2, 4 6 5         3, 4 6 5                   4 7, 6 4 6
 +  2 3, 5 3 2     +  4 2, 3 5 4             +          2 4 3
 ------------------  ----------------          ------------------


 ------------------  ----------------          ------------------


    2 7, 5 4 1                                    6 3, 4 5 6
    5 4, 6 5 3        4 2, 3 7 7                   3 7, 8 7 8
 +  2 9, 3 8 9     +     5 8 4                 +      1, 4 2 0
 ----------------    ------------             ----------------


 ----------------    ------------             ----------------
```

Subtraction of four digit numbers

We can subtract four digit numbers like three digit numbers with an additional step of renaming a one thousand as 10 hundreds if the numbers of hundreds to be subtracted is more and subtracting the thousands. To subtract four-digit numbers

1. Write the number from which a number is to be subtracted first. Write the number to be subtracted below that aligning ones, tens and hundreds of the two numbers. We may write Th for ten thousands H for Hundreds T for Tens and O for Ones above the numbers. Draw a line below the numbers to write the difference.
2. Subtract and rename ones and tens as for three-digit numbers.
3. Look at hundreds, if the number of hundreds to be subtracted is less than or equal to the number of hundreds in the number from which it is to be subtracted, subtract it.
   If the number of hundreds to be subtracted is more than the number from which it is to be subtracted, rename 1 thousand as 10 hundreds and add that to hundreds. Correct the thousands and write 1 before hundred's place to remember that there are 10 more hundreds in hundred's place. Subtract the hundreds from hundreds and write it in hundred's place below the line in hundred's place.
4. Subtract the thousands from thousands and write it in thousand's place below the line in thousand's place

   Example 6

   Subtract 3,448 from 7,523.

   Write 7,523 and 3,448 below that aligning one's, ten's, hundred's and thousand's places. Draw a line below the numbers.

   Th H T O
   ```
         4 11
          113
      7,5̷2̷3̷
     -3,4 4 8
     --------
       4,075
   ```

1. As the number of ones to be subtracted is more than 3, we rename 1 ten as ten ones and correct the tens and ones after grouping by striking off 2 and writing 1 in ten's place and writing 13 in one's place. Then subtract the ones from ones gives 5, write it under the line in one's place.
2. We next look at tens, as 4 tens are to be subtracted and we have only 1 ten, we rename 1 hundred as 10 tens and add that to 1 ten. We strike off 6

and write 5 in hundred's place and 11 in ten's place. Subtracting 4 tens from 11 tens we get 7 and write it in ten's place below the line.
3. Subtract 4 hundreds from 4 hundreds which gives 0, write it in hundred's place below the line.
4. Subtract 3 thousands from 7 thousands which gives 4 write it in thousand's place below the line.

Example 7

```
    2  13
         9 15
       3 10
  3 4 0 5
- 1 5 6 8
------------
  1 8 3 7
------------
```

1. As the number of ones to be subtracted is more than 5, we need to rename tens. However, as there are zero tens, we rename one hundred as ten tens and write it in ten's place and reduce the numbers of hundreds by one. We now rename one ten as ten ones so that we have 15 ones and 9 tens. Subtracting 8 ones from 15 ones, we have 7 ones which we write in one's place below the line.
2. Then subtracting 6 tens from 9 tens, we get 3 tens which we write in ten's place below the line.
3. Again we cannot subtract 5 hundreds from 3 hundreds, we rename 1 thousand as 10 hundreds so that we have 13 hundreds and reduce the number of thousands by one. Subtracting 5 hundreds from 13 hundreds, we get 8 which we write in hundred's place.
4. Then subtracting thousands from thousand, we get one, which we write in thousand's place.

Example 8

```
         9 9 16
       6 10 10
   7 0 0 6
 - 4 2 5 8
-----------
   2 7 4 8
-----------
```

As the number of ones to be subtracted is more than 6, we need to rename tens. However, as there are zero tens, we have to first rename one hundred as ten tens. Nevertheless, there are no hundreds either, so we first rename one

25

thousand as ten hundreds and write it in hundred's place and reduce the numbers of thousands by one. We now rename one hundred as ten tens and reduce the number of hundreds by 1. Then rename one ten as ten ones and reduce the numbers of tens by 1.We now have 6 thousands, nine hundreds, 9 tens and 16 ones.

We now subtract the ones from ones, tens from tens, hundreds from hundreds and thousands from thousands and write below the line in one's place, ten's place, hundred's place and thousand's place in order.

Checking Subtraction

We can check if our subtraction is correct by adding the difference to the number that was subtracted; it should equal the number from which it was subtracted.

Example 9

```
  5 12 14
   7  4 18
 6 3 5 8              Verification of the answer
- 4 5 6 9               1 7 8 9
-----------           +4 5 6 9
                      ---------
  1 7 8 9              6 3 5 8
-----------           ---------
```

The sum of difference-1789 and the number that was subtracted-4569 is the same as the number-6358 from which it was subtracted. Hence the answer is correct.

Subtraction from hundreds

Subtraction of a number from hundreds can be carried out more easily than the short form algorithm by thinking of the number of tens in it and regrouping one ten as 10 ones.

Example 10

Subtract 367 from 700,

To subtract 367 from 700, we think of 700 as 70 tens = 69 tens + 1 ten = 69 tens and 10 ones, that makes the subtraction easier.

```
  691
  700
- 367
-------
  333
-------
```

Subtraction from thousands
Subtraction of a number from thousands can be carried out more easily than the short form algorithm by thinking of the number of tens in it and regrouping it as 10 ones.
Example 11
Subtract 4,257 from 6,000
To subtract 4,257 from 6,000, we think of 6,000 as 600 tens = 599 tens +1 ten =599 tens and 10 ones, that makes the subtraction easier.

```
  5 9 91
  6,000
- 4,257
---------
  1,743
----------
```

Other computational ideas
In many cases, a method called **equal additions** can be used to make computations easier by adding the same number to both numbers that does not affect the difference.
For example 4 – 0 = 4
1f we add 1 to both the numbers we have 5 – 1 the difference 4 again.
1f we add 2 to both the numbers we have 6 – 2 the difference is 4 again.
1f we add 3 to both the numbers we have 7 – 3 the difference is 4 again.
Similarly, we can use **equal subtractions** to make computations easier by subtracting the same number from both the numbers that does not affect the difference.
For example 10 – 8 = 2
1f we subtract 2 from both the numbers we have 8 – 6 = 2 again.
1f we subtract 3 from both the numbers we have 7 – 5 =2 again.
We may use these methods in some cases to make computations easier.
Example 12
Find 1000 –598
If we add 2 to both numbers, we have,

```
  1002
-  600
----------
   402
```

Or if we subtract 1 from both the numbers, we have

```
  999
- 597
---------
```

$$\frac{402}{--------}$$

Both of which are easier to compute.

Exercise 3.3

1. Subtract the following mentally and tell how you got the answer:
   (a) 100 - 46   (b) 204 - 98   (c) 1000 - 396
   (d) 700 - 198   (e) 500 - 245   (f) 203 - 98

2. Check the following answers by addition and mark a X against the wrong ones:
   (a) 6742 - 3894 = 3152
   (b) 4000 -345 = 4345
   (c) 5000 - 4328 = 672

3.   Subtract

Th H T O	Th H T O	Th H T O
5 6 7 8	5 0 0 3	5 0 6 8
- 2 4 3 3	-2 7 4 5	-3 2 7 4
---------	---------	---------
---------	---------	---------
9 4 5 3	6 5 7 3	6 0 0 0
-4 2 6 8	- 3 4 2 1	-3 6 2 8
---------	---------	---------
---------	---------	---------
4 8 6 0	6 4 2 3	4 5 3 2
-3 9 7 2	-2 5 7 4	- 3 2 2 8
---------	---------	---------
---------	---------	---------
8 0 6 4	7 4 0 6	8 1 4 3
-6 5 4 7	-5 7 4 7	-6 5 8 5
---------	---------	---------
---------	---------	---------

Subtraction of five digit numbers

We can similarly subtract five-digit numbers with an additional step of exchanging a ten thousand with ten thousands if the number of thousands in the number to be subtracted is more and subtracting the ten thousands. To subtract five-digit numbers

1. Write the number from which a number is to be subtracted first. Write the number to be subtracted below that aligning ones, tens, hundreds, thousands and ten thousands of two numbers. We may write Th for ten thousands, T for thousands, H for Hundreds T for Tens and O for Ones above the numbers. Draw a line below the numbers to write the difference.
2. Subtract and rename ones tens and hundreds as in four-digit numbers.
3. Look at thousands, if the number of thousands to be subtracted is less than or equal to the number of thousands in the number from which it is to be subtracted, subtract it.
   If the number of thousands to be subtracted is more than the number of thousands from which it is to be subtracted, rename 1 ten thousand as 10 thousands and add that to thousands. Correct the ten thousands and thousands. Subtract the thousands from thousands and write it in thousand's place below the line in thousand's place.
4. Subtract the ten thousands from ten thousands and write it in ten thousand's place below the line in thousand's place.

Exercise 3.4

Subtract

Ten th Th H T O	Ten th Th H T O	Ten th Th H T O

```
    2 5 6 5 2          5 6 8 4 9          7 4 6 3 4
-   1 3 4 4 2      -   2 4 7 3 6      -   4 2 3 5 8
---------------    ---------------    ---------------


---------------    ---------------    ---------------


    4 5 3 2 7          6 5 3 0 4          7 8 0 3 2
-   2 4 5 8 9      -   4 5 6 7 8      -   5 6 7 4 5
---------------    ---------------    ---------------


---------------    ---------------    ---------------


    2 6 0 5 7          8 5 0 3 7          1 0 5 2 4
-   1 5 8 8 5      -   5 6 4 2 9      -     8 7 3 5
---------------    ---------------    ---------------


---------------    ---------------    ---------------


    9 0 0 4 3          4 2 0 0 1          4 0 0 0 0
-   5 7 5 8 7      -   1 8 0 5 2      -   2 5 0 6 7
---------------    ---------------    ---------------


---------------    ---------------    ---------------


    6 0 0 0 0          2 0 0 0 0          1 0 0 0 0
-     1 7 3 2      -     6 3 1 5      -       4 8 9
---------------    ---------------    ---------------


---------------    ---------------    ---------------
```

Estimation and judging reasonableness of answers

It is concerned with quickly estimating an approximate answer to computations arrived at by addition, subtraction, multiplication and division of numbers. We can do it by rounding off numbers to nearest ten, hundred, thousand etc. and then performing addition, subtraction, multiplication and division as the case may be. If it is close to the answer arrived at by calculation, the answer is reasonable. This is desirable even if you had calculated using a calculator, because a wrong key may have been pressed.

Rounding of numbers to nearest ten

For rounding off a number to nearest 10, find two consecutive multiples of ten between which it lies and then round it off to the nearest one. For example 43 lies between 40 and 50 we can round it off to 40 as 43 is closer to 40 rather than 50. Similarly 77 lies between 70 and 80, we may round off 77 to 80 as it is closer to 80 than 70.

Rounding of numbers to nearest hundred

For rounding off a number to nearest hundred, find two consecutive multiples of hundred between which it lies and then round it off to the nearest one. For example 432 lies between 400 and 500 we can round it off to 400 as 432 is closer to 400 rather than 500. Similarly 367 lies between 300 and 400, we may round off 367 to 400 as it is closer to 400 than 300.

Rounding of numbers to nearest thousand

For rounding off a number to nearest thousand, find two consecutive multiples of thousand between which it lies and then round it off to the nearest one. For example 2412 lies between 2000 and 3000 we can round it off to 2000 as 432 is closer to 2000 rather than 3000. Similarly 6789 lies between 6000 and 7000, we may round off 6789 to 7000 as it is closer to 7000 than 6000.

If a number is midway between two multiples we rounding it off to the higher multiple is conventional in mathematics

Estimation of sums
Example 13

```
  63
+48
------

------
```

We can round off 63 as 60 and 48 as 50, so the sum should be close to 110. The exact sum is 111 close to it.

Example 14

```
  420
+567
-------

-------
```

In this case, we can round both the numbers to nearest hundred to make a quick estimate. Number 420 can be rounded to 400 and 567 to 600, so the sum should be close to 1,000. The exact sum is 987 close to it.

Example 15

```
 5,853
+4,982
--------
10,835
--------
```

In this case, we can round both the numbers to nearest thousand to make a quick estimate. Number 5853 rounded to nearest thousand is 6000 and 4982 to 5000, so the sum should be close to 11,000. The exact sum is 10,835 close to it.

Estimating Differences

If we do not have much time as in an examination, we can quickly estimate the answer by rounding to nearest ten, hundred or thousand whichever is appropriate.

Example 16

Subtract 2943 from 7694

We can round 2943 to 3000 and 7694 to 8000, the difference should be about 5000. The exact difference is 4751 close to 5000.

Exercise 3.5

1. Round off the following numbers to nearest ten.
   (a) 36
   (b) 42
   (c) 367
   (d) 550
2. Round off the following numbers to nearest hundred.
   (a) 223
   (b) 550
   (c) 687
   (d) 1357
   (e) 2515
3. Round off the following numbers to nearest thousand.
   (a) 2773
   (b) 4217
   (c) 2687
   (d) 41357
   (e) 72715
4. Estimate the following to nearest ten:
   (a) 42 + 67   (b) 29 + 38   (c) 68 – 42
5. Estimate the following to nearest hundred:
   (a) 324 + 161   (b) 984 - 392   (c) 825- 347
6. Estimate the following to nearest thousand:
   (a) 5,843 + 6,325   (b) 8,512 + 4 879
   (c) 6,435 - 2,789   (d) 17,856 - 9,902

Addition and Subtraction together

Some situations require both addition and subtraction. For example, you bought a book for 35 rupees and notebooks for 20 rupees. The shopkeeper asks you to give him 55 rupees. As you do not have exact change you give him a hundred-rupee note; then he subtracts 55 from hundred to find the amount he should return to you. The mathematical sentences for this would be

35 + 20 = 55

100 – 55 = 45

We can also write both the transactions in one mathematical sentence as

100 – (35 + 20)

The use parentheses indicate that the expression within brackets is to be simplified first and then the remaining expression. For example, to simplify 100 – (35 + 20) we first compute 35 + 20 and then subtract the result from 100.

Exercise 3.6

1. Find

   $10 - (4 + 3) =$

   $100 - 37 =$

   $45 - (15 + 7) =$

   $450 - 100 - 245 =$

   $100 - (25 + 42) =$

2. Use parentheses in the following number sentences so that they will be true statements.

   $10 - 2 + 4 = 4$

   $50 - 12 + 16 = 22$

   $45 - 22 + 4 = 27$

   $100 - 37 - 10 = 53$

   $500 - 67 + 42 = 391$

3. (a) Ramesh bought a toy for 120 rupees and a ball for 15 rupees. How much money should he pay the shopkeeper?

   (b) If he gave the shopkeeper 150 rupees, how much money should the shopkeeper should return to him?

   (c) Write both the transactions in one mathematical sentence.

4. A school had 1234 students. At the end of the end of the year 75 left school and 135 new students joined school.

   (a) Write a mathematical sentence to find out how many students are there in the school now?

   (b) Find the number of students in the school now.

5. A bus had 40 passengers; on the next bus stop 5 got down and 7 boarded the bus.

   (a) Write a mathematical sentence to find out how many passengers are there in the bus now?

   (b) Find the number of passengers in the bus now.

UNIT 3

Multiplication

Multiplication facts

The product of two one-digit numbers is called a **multiplication fact**. You had learned these in class 3. You should be able to recall these without thinking, as it would be helpful for multiplying all numbers however large. Look at the mastery test on multiplication, write the ones you can recall immediately and put an X against others. Find those by using any of the aids learnt in class 3 and learn them. We will review here the use of a grid with an L-shaped cover and multiplication table only.

Use of grid:

A 9×9 square grid with the help of a L-shaped cover can be used to find the multiplication facts by exposing rows corresponding to one of the numbers and columns corresponding to the other number and counting the number of squares in it which gives the product. For example to find 4×6, expose 4 rows and 6 columns and count the number of squares which is 24, therefore $4 \times 6 = 24$.
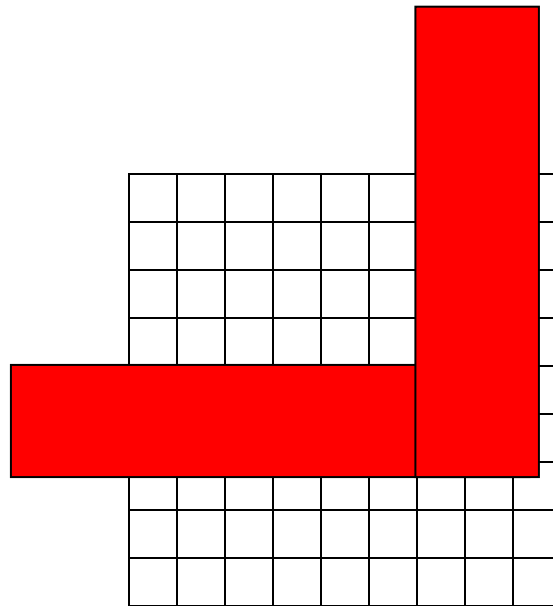
Use of a multiplication table

A multiplication table given on next page summarises all the multiplication facts in one table and is handy for finding multiplication facts that you cannot recall immediately.

Multiplication Table

×	0	1	2	3	4	5	6	7	8	9
0	0	0	0	0	0	0	0	0	0	0
1	0	1	2	3	4	5	6	7	8	9
2	0	2	4	6	8	10	12	14	16	18
3	0	3	6	9	12	15	18	21	24	27
4	0	4	8	12	16	20	24	28	32	36
5	0	5	10	15	20	25	30	35	40	45
6	0	6	12	18	24	30	36	42	48	54
7	0	7	14	21	28	35	42	49	56	63
8	0	8	16	24	32	40	48	56	64	72
9	0	9	18	27	36	45	54	63	72	81

Each cell gives the product of the number at the beginning of the row with the number at the top of the column.

The first row gives the product of different numbers and 0. Note that product of any number and 0 is zero.

The second row gives the product of different numbers and 1. Note that product of any number and 1 is that number.

The third row gives the product of different numbers and 2. These are the same as the numbers that we would get by counting 1, 2, 3 ,4 numbers by 2 beginning with 2.

The fourth row gives the product of different numbers and 3, and so on.

The numbers in the cells with red borders are the product of a number with itself.

We can find a specific multiplication fact by highlighting a row with one of the numbers at the beginning of the row and a column with other number at the top of the column. The number in the cell in which the highlighted row and column meet gives the product of the two numbers.

For example, to find 8×7, we highlight the row with number 8 at the beginning of the row and a column with number 7 at the top of the column. As the cell in which highlighted row and column meet has 56 in it, the product of 8 and 7 is 56 or $8 \times 7 = 56$.

Properties of multiplication

- The order of numbers in a multiplication as in addition does not matter. Verify from Multiplication Table:

  $3 \times 4 = 4 \times 3 = 12$, $6 \times 8 = 8 \times 6 = 48$, $8 \times 9 = 9 \times 8 = 72$.

- We can multiply three numbers by first multiplying any two of them and then multiplying their product with the third number

  $3 \times 5 \times 2 = 15 \times 2$

  $3 \times 5 \times 2 = 3 \times 10$

  $3 \times 5 \times 2 = 6 \times 5 = 30$

- As the grid given below shows the product of a number and sum of two numbers is the same as sum of the products of the number with the individual numbers e.g. $5 \times 6 = 5 \times (4 + 2) = 5 \times 4 + 5 \times 2$.

$$\xleftarrow{\hspace{1cm}} 5 \times 4 \xrightarrow{\hspace{1cm}} \xleftarrow{} 5 \times 2 \xrightarrow{}$$
$$\xleftarrow{\hspace{2cm}} 5 \times 6 \xrightarrow{\hspace{2cm}}$$
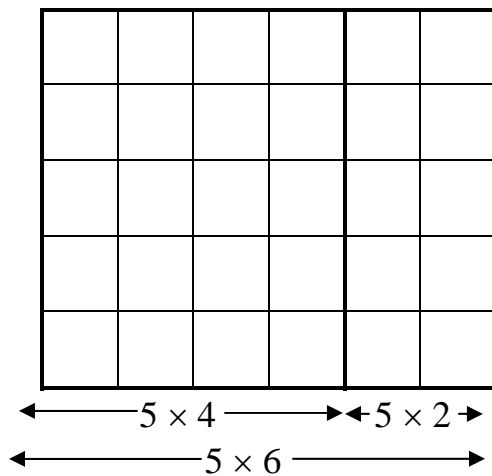
These properties together with the concept of place value can be used to simplify some multiplications so that they can be performed mentally. These also enable us to multiply large numbers.

Examples

$2 \times 6 \times 5 = 2 \times 5 \times 6 = 10 \times 6 = 60$

$4 \times 8 \times 2 = 4 \times 2 \times 8 = 8 \times 8 = 64$

$5 \times 14 = 5 \times (10 + 4) = 5 \times (10 + 4) = 5 \times 10 + 5 \times 4 = 50 + 20 = 70$

Multiplying a number by ten

The product of a number by ten is as many tens as the number.

Examples

$7 \times 10 = 7$ tens $= 70$

$4 \times 10 = 4$ tens $= 40$

$23 \times 10 = 23$ tens $= 230$

Multiplying a number by a multiple of tens
- We write the multiple of 10 as a product of one digit number and ten
- Find the product of one-digit number and the number
- Multiply the product by 10.

Examples

$4 \times 20 = 4 \times 2 \times 10 = 8 \times 10 = 80$

$2 \times 30 = 2 \times 3 \times 10 = 6 \times 10 = 60$

$7 \times 50 = 7 \times 5 \times 10 = 35 \times 10 = 350$

Multiplying a number by 100

The product of any number and hundred is as many hundreds as the number. For example,

$5 \times 100 = 5$ hundreds $= 500$

$36 \times 100 = 36$ hundreds $= 3600$

$483 \times 100 = 483$ hundreds $= 48300$

Multiplying a number by a multiple of hundreds
- We write the multiple of 100 as a product of one digit number and hundred.
- Find the product of one-digit number and the number
- Multiply the product by 100.

Examples

$7 \times 100 = 700$

$4 \times 300 = 4 \times 3 \times 100 = 12 \times 100 = 1,200$

$36 \times 400 = 36 \times 4 \times 100 = 144 \times 100 = 14,400$

$483 \times 700 = 483 \times 7 \times 100 = 3381 \times 100 = 3,38,100$

Multiplication of a number by a one-digit numbers

We can multiply a number by a one-digit number by
- Writing the number in expanded form
- Multiplying multiples of hundreds, multiples of tens and ones with the one-digit number.

Adding all the products

Example 1

$3 \times 23 = 3 \times (20 + 3) = 3 \times 20 + 3 \times 3 = 3 \times 2 \times 10 + 9 = 6 \times 10 + 9 = 60 + 9 = 69$

We can write it in column form as

```
 23
×  3
------
```
   9   3×3 multiplying the ones by 3

| 60 | 20×3 | multiplying the tens by 3 |

| 69 | $9 + 60$ | adding the products |

Example 2

$2 \times 433 = 2 \times (400 + 30 + 3) = 2 \times 400 + 2 \times 30 + 2 \times 3 = 400 + 60 + 6 = 466$

We can write it in column form as

```
  433
×   2
------
```

6	2×3	multiplying the ones by 2
60	2×30	multiplying the tens by 2
800	2×400	multiplying the hundreds by 2

| 866 | $6 + 60 + 800$ | adding the products |

Example 3

$4 \times 46 = 4 \times (40 + 6) = 4 \times 40 + 4 \times 6 = 160 + 24 = 184$

We can write it in column form as

```
 46
× 4
------
```

| 24 | 6×4 | multiplying the ones by 4 |
| 160 | 40×4 | multiplying the tens by 4 |

| 184 | $24 + 160$ | adding the products |

Example 4

$437 \times 4 = (400 + 30 + 7) \times 4$

$\qquad = 400 \times 4 + 30 \times 4 + 7 \times 4$

$\qquad = 1600 + 120 + 28$

$\qquad = 1,812$

We can write it in column form as

```
  437
×   4
--------
```

28	7×4
120	30×4
1600	400×4

```
---------
   1748                    28 + 120 + 1600
---------
```

Exercise 3.1

1. Fill in the blanks
   (a) $6 \times 0 =$ ____
   (b) $7 \times 0 =$ ____
   (c) $10 \times 0 =$ ____
   (d) $34 \times 0 =$ ____
   (e) $472 \times 0 =$ ____
2. Multiply the following mentally:
   (a) $3 \times 2 \times 4$ (b) $2 \times 4 \times 7$ c) $8 \times 2 \times 5$
   (d) $2 \times 8 \times 4$ (e) $3 \times 9 \times 2$ (f) $6 \times 5 \times 7$
   (g) 5×12 (h) 2×18 (i) 4×13
   (j) 7×16 (k) 5×15 (l) 6×14
3. Fill in the blanks
   (a) $7 \times 4 = 4 \times$ ____
   (b) $5 \times$ ____ $= 6 \times 5$
   (c) $6 \times 8 \times 2 = 48 \times$ ____
   (d) $4 \times 7 \times 3 = 4 \times$ ____
   (e) $2 \times 6 \times 5 = 10 \times$ ____
   (f) $8 \times (5 + 4) = 8 \times 5 + 8 \times$ ____
   (g) $9 \times 8 = 9 \ (2 +$ ____$)$
   (h) $6 \times (2 + 5) = 6 \times$ ____
4. Find the following products
   (a) 3×10 (b) 27×10 (c) 180×10
   (d) 124×10 (e) 378×10 (f) 5482×10
5. Find the following products
   (a) 3×30 (b) 5×50 (c) 6×80
   (d) 4×120 (e) 7×90 (f) 4×70
6. Find the following products
   (a) 4×100 (b) 63×100 (c) 75×100
   (d) 3×400 (e) 7×700 (f) 8×900
7. Multiply the following
   (a) 43×2 (b) 11×6 (c) 32×3
   (d) 62×5 (e) 23×8 (f) 92×7
   (g) 56×4 (h) 74×9 (i) 243×2
   (j) 132×3 (k) 451×6 (l) 673×8
   (m) 539×4 (n) 972×7 (o) 825×5
   (p) 659×9 (q) 368×6 (r) 148×8

Short algorithm for multiplication of a two-digit number by a one-digit number

We can write the multiplication of a two-digit number by a one-digit number say 56 × 6 in short form as follows:

- Write the multiplication in column form and draw a line below the numbers.
- Multiply the ones by 6, 6 × 6 = 36 = 3 tens + 6 ones, write the 6 in one's place below the line and tens in ten's place above the numbers for addition to tens after multiplication of tens.
- Multiply the tens by 6, 5 tens × 6 = 30 tens.
- Add 3 tens to it, 30 tens + 3 tens = 33 tens
- Rename 33 tens as 3 hundreds and 3 tens
- Write the tens and hundreds below the line in ten's place and hundred's place.

```
  3
  56
× 6
-------
336
-------
```

We can write the multiplication of a three-digit number by a one-digit number say 258 × 4 in short form as follows:

- Write the multiplication in column form and draw a line below the numbers.
- Multiply the ones by 4, 8 × 4 = 32, write the 2 in one's column below the line and tens in ten's column above the numbers for addition to tens after multiplication of tens by the number.
- Multiply the tens by 4, 5 tens × 4 = 20 tens.
- Add 3 tens to 20 tens, 20 tens + 3 tens = 23 tens
- Rename 23 tens as 2 hundreds + 3 tens.
- Write the 3 in ten's column below the line and 2 hundreds in hundred's column above the numbers for addition to hundreds after multiplication of hundreds by the number.
- Multiply the hundreds by 4, 2 hundreds × 4 = 8 hundreds
- Add 2 hundreds to it, 8 hundreds + 2 hundreds = 10 hundreds
- Rename 10 hundreds as 1 thousand
- Write 0 in hundred's place (as there are 0 hundreds) and 1 in thousand's place below the line.

```
  2 3
  258
×   4
-------
1032
-------
```

Multiplication of a number by a two-digit number

Multiplication of a number by a two-digit number can be done by following the steps given below:

- Multiply the number by ones
- Multiply the number by tens
- Add the two

Example 1

```
  1
   3
  45
 ×36
------
 270            45 × 6
1350            45 × 30
-------
1620            270 + 1350
-------
```

Example 2

```
  1
   5
  58
 ×27
------
 406            58 × 7
1160            58 × 20
-------
1566            406 + 1160
-------
```

Example 3

```
   3 1
    4 2
  263
 ×  57
------
  1841              263 × 7
13150              263 ×50
-------
14991              1841 +13150
-------
```

Example 4

```
   66
    33
  578
  ×84
---------
  2312             578 × 4
 46240             578 × 80
----------
 48552             2312 + 46240
----------
```

Multiplication of a three-digit number by a three-digit number

Multiplication of a number by a three-digit number can be done by following the steps given below:

- Multiply the number by ones
- Multiply the number by tens
- Multiply the number by hundreds
- Add them.

Example 1

$$\begin{array}{r} {\scriptstyle 1} \\ {\scriptstyle 25} \\ {\scriptstyle 14} \\ 538 \\ \times\,275 \\ \hline \end{array}$$

2690	538×5
37660	538×70
107600	538×200

147950	$2690 + 37660 + 107600$

Example 2

$$\begin{array}{r} {\scriptstyle 24} \\ {\scriptstyle 12} \\ 726 \\ \times\,840 \\ \hline \end{array}$$

29040	726×40
580800	726×800

609840	$29040 + 580800$

Example 3

$$\begin{array}{r} {\scriptstyle 31} \\ {\scriptstyle 62} \\ 694 \\ \times\,407 \\ \hline \end{array}$$

4858	694×7
277600	694×400

282458	$4858 + 277600$

Estimation of products

As the numbers get large, it becomes tedious to multiply by paper and pencil and one may use a calculator. However, one can make mistakes with the calculator also. We can find an estimate by rounding off the two-digit numbers to nearest ten, three-digit numbers to nearest hundred and

multiplying these mentally. This would help us to find out whether the product given by calculator is reasonable or not.

Example 1

Find an estimate of the product of 47×32

Rounding off 47 and 32 to nearest 10, we get 50 and 30 and multiplying them the estimate of the product is 1500. Whereas $47 \times 32 = 1504$ close to it.

Example 2

Find an estimate of the product of 210×58

Rounding off 210 to nearest 100 and 58 to nearest 10, we get 200 and 60 and multiplying them the estimate of the product is 12000. Whereas $210 \times 58 = 12180$ close to it.

Example 3

Find an estimate of the product of 680×523

Rounding off 680 and 523 to nearest 100, we get 700 and 500 and multiplying them the estimate of the product is 3,50,000. Whereas $680 \times 523 = 3,55,640$ close to it.

Exercise 3.2

1. Multiply the following:
   (a) 24 × 5   (b) 30 × 8   (c) 349 × 7
   (d) 604 × 6   (e) 780 × 9   (f) 463 × 4

2. Multiply the following:
   (a) 16 × 12   (b) 56 × 23   (c) 60 × 45
   (d) 49 ×34   (e) 74 × 65   (f) 89 × 70
   (g) 75 × 58   (h) 23 × 67   (i) 88 × 82
   (j) 40 × 63   (k) 46 × 80   (l) 93 × 64

3. Multiply the following:
   (a) 283 × 14   (b) 539 × 26   (c) 974 × 38
   (d) 736 × 57   (e) 853 × 49   (f) 389 × 72
   (g) 847 × 86   (h) 178 × 95   (i) 470 × 66
   (j) 893 × 73   (k) 906 × 82   (l) 500 × 75

4. Multiply the following:
   (a) 374 × 263   (b) 542 × 681   (c) 825 × 359
   (d) 684 × 223   (e) 657 × 325   (f) 542 × 736
   (g) 365 × 842   (h) 794 × 408   (i) 439 × 300
   (j) 706 × 257   (k) 583 × 207   (l) 851 × 608

5. Read the numbers given below:
   (a) 600   (b) 3,200   (c) 28,000
   (d) 54,000   (e) 1,50,000   (f)3,20,000

6. Multiply the following mentally:
   (a) 30 × 40   (b) 50 × 80   c) 60 × 90
   (d) 200 × 30   (e) 400 × 60   (f) 700 × 70
   (g) 600 × 200   (h) 500 × 300   (i) 400 × 800

7. Multiply the following and estimate the following products to check if your answer seems reasonable.
   (a) 48 × 63   (b) 52 × 84   c) 37 × 23
   (d) 168 × 23   (e) 842 × 48   (f) 670 × 32
   (g) 493 × 325   (h) 875 × 437   (i) 782 × 514

Applications of multiplication in daily life

Ask students to give situations in daily life that call for multiplication.

Multiplication of three numbers

There are some situations where we need to multiply three numbers. For example, a carton can hold 20 pencil boxes each of which contains 12 pencils, and we want to know how many pencils will 5 cartons contain? Here we first find how many pencils would one carton contain and then how many pencils would six cartons contain as follows:

1 carton will contain 20×12 pencils = 240 pencils.

5 cartons will contain $240 \times 5 = 1200$ pencils.

Exercise 3.3

1. A notebook costs 6 rupees. How much money do you need for buying 8 notebooks?
2. There are 35 oranges in a basket. How many oranges would be there in 6 baskets?
3. A packet of candles contains 24 candles. Raj bought 5 packets, how many candles did he buy?
4. If Meena has 45 fifty-rupee notes, how much money does she have?
5. A dining chair costs Rs. 750 and a dining table Rs 1250. If Sunita bought 6 dining chairs and a dining table, how much money should she pay to the shopkeeper?
6. Rajan bought 12 roses each costing 5 rupees.
   (a) How much money he should pay to the shopkeeper?
   (b) If he paid a 100-rupee note to the shopkeeper, how much money the shopkeeper should return to him?
7. A carton can hold 24 boxes of candles each of which contains 10 candles, Ronit bought 3 cartons of candles for Diwali, find out how many candles did he buy?
8. A week has seven days. How many days would be there in 52 weeks?
9. 1 centimetre = 10 millimetres, how many millimetres would be there in 3 centimetres?
10. Give situations in daily life that require multiplication of three numbers.

Mastery Test in Multiplication Facts

Multiply

6	4	2
× 3	× 6	× 2
------	------	------
------	------	------
5	8	3
× 4	× 4	× 9
------	------	------
------	------	------
4	7	5
× 2	× 0	× 3
------	------	------
------	------	------
3	6	2
× 7	× 7	× 6
------	------	------
------	------	------
7	5	7
× 7	× 5	× 5
------	------	------
------	------	------
3	4	4
× 8	× 7	× 7
------	------	------
------	------	------
3	7	9
× 3	× 0	× 1
------	------	------
------	------	------

```
      8                    2                    2
    × 1                  × 7                  × 9
   ------               ------               ------


   ------               ------               ------
      2                    4                    2
    × 5                  × 9                  × 3
   ------               ------               ------


   ------               ------               ------
      3                    2                    5
    × 4                  × 8                  × 9
   ------               ------               ------


   ------               ------               ------
      5                    8                    9
    × 6                  × 5                  × 6
   ------               ------               ------


   ------               ------               ------
      8                    4                    8
    × 6                  × 4                  × 9
   ------               ------               ------


   ------               ------               ------
      7                    5                    9
    × 9                  × 9                  × 9
   ------               ------               ------


   ------               ------               ------
      6                    7                    8
    × 6                  × 8                  × 8
   ------               ------               ------


   ------               ------               ------
```

UNIT 4

Multiples and Factors

Multiples

The products of a number by any number are called multiples of the number.
As $5 \times 1 = 5$, $5 \times 2 = 10$, $5 \times 3 = 15$, $5 \times 4 = 20$………

5, 10, 15, 20… are multiples of 5.

Similarly $2 \times 1 = 2$, $2 \times 2 = 4$, $2 \times 3 = 6$, $2 \times 4 = 8$, $2 \times 5 = 10$…

2, 4, 6, 8, 10…are multiples of 2.

A number can have any number of multiples.

We can find multiples of a number say 7 by either of the following methods.

- Encircling every 7th number in the hundred table beginning with 7. All the encircled numbers are multiples of 7.
- Multiplying 7 in turn by 1, 2, 3, 4, 5, 6 … all the products are multiples of the number.

Odd and even numbers

All multiples of 2 are called **even numbers**

A number that is not a multiple of 2 is called **odd**.

We can find all even numbers by encircling every alternate number beginning with 2 in a hundred table. What do you notice about the digit in one's place in these? (The digit in one's place is 0, 2, 4, 6 or 8.)

The numbers that are not encircled are odd. What do you notice about the digit in one's place in these? (The digit in one's place is 1, 3, 5, 7, or 9.)

All counting numbers are either even or odd.

Multiples of 5 and 10

We can find all multiples of 5 by encircling every fifth number beginning with 5 in a hundred table. What do you notice about the digit in one's place in these? (The digit in one's place is 0 or 5.)

We know from the table of 10, all multiples of 10 will have 0 in one's place.

Factors

If a number divides another number evenly, that is the remainder is zero the number is said to be a factor of the other number. We will restrict to two-digit numbers only.

$7\overline{)42} = 6$, therefore 7 is a factor of 42.

We also know that if $42 \div 7 = 6$, $42 \div 6 = 7$, therefore the quotient is also a factor of that number.

To check if a number say 4 is a factor of another number, say 17, we may

- Set aside 17 objects, and make as many groups of 4 objects and check if

any objects are left over. If some objects are left, then 4 is not a factor of 17. In this case we can make 4 groups of 4 objects and 1 object is left over. Thus 4 is not a factor of 17.

- Encircle every fourth number, and stop when the encircled number is equal to or exceeds the number 17. In this case we will encircle only 4, 8, 12 and 16 as the next number 20 > 17.Four is a factor of 17 only if 17 is one of the encircled numbers. As 17 is not one of the encircled numbers 4 is not a factor of 17.
- Divide 17 by 4, using long division and check if the remainder is 0.

$$\begin{array}{r} 4 \\ 4\overline{)17} \\ 16 \\ \hline 1 \end{array}$$

As the remainder is not 0, therefore 17 is not divisible by 4.

- As any number is divisible by 1, the number, **1 is a factor of any number**.
- As any number is divisible the number itself, **the number itself is a factor of any number.**

A number except 1 has 2 or more factors.

If a number is a factor of a number, all its factors are also factors of the number.

Verify 6 is a factor of 24, all factors of 6 that is 1, 2, 3 and 6 are also factor of 24.

When we multiply two or more than two numbers, each number is a factor of the product.

For example, $7 \times 8 = 56$, 7 and 8 are factors of 56.

Similarly as $3 \times 4 \times 5 = 60$, 3, 4, 5 are factors of 60.

Counter example

In mathematics, even a single example that does not hold proves the genralisation wrong. For example, to disprove the generalisation that if a number is factor of a number all its multiples are also factors of a number. The example 2 is a factor of 10, but its multiple 4 is not a factor of 10 is sufficient to disprove the generalisation. The example that disproves it is called a counter example.

Finding all factors of a number

While you can find all factors of a number by dividing the number by 1, 2, 3, 4, and so on and checking whether it is divisible or not. You can use some generalizations to shorten your work. These are

- One is a factor of any number and is the smallest factor.

- The number itself is a factor of all numbers and is the greatest factor.
- A number has only a limited number of factors
- If any divisor is a factor of the number, then the quotient is also the factor. That is if 7 is a factor of 63, the quotient 9 obtained by dividing 63 by 7 is also a factor.
- You stop when the divisor and quotient are interchanged.

Example 1
Find all factors of 20.

$$2\overline{)20}\ \ \frac{10}{}$$
2
0

Therefore, 2 and 10 are factors of 20

$$3\overline{)20}\ \ \frac{6}{}$$
18
2

Therefore, 3 and 6 are not factors of 20

$$4\overline{)20}\ \ \frac{5}{}$$
20
0

Therefore, 4, 5 are factors of 20

$$5\overline{)20}\ \ \frac{4}{}$$
20
0

Stop here as the divisor and quotient are interchanged

All factors of 20 are 1, 2, 4, 5, 10 and 20.
Example 2
Find all factors of 21
As 21 is an odd number, it is not divisible by even numbers, so we will not check those numbers.
Also as the last digit is not 0 or 5, 21 is not divisible by, therefore we do not need to check 5 either.

$$3\overline{)21}\ \ \frac{7}{}$$
21
0

Therefore 3 and 7 are factors of 21

$$7\overline{)21}\ \ \frac{3}{}$$
21
0

Stop here as the divisor and quotient are interchanged

Therefore all factors of 21 are 1, 3, 7, 21.
Example 3
Find all factors of 60.
As 60 ends in 0, it is divisible by 5, 10.
As 60 ends in 0, it is an even number and therefore divisible by 2.

As 60 ÷ 2 = 30, 30 is a factor of 60.
As 60 ÷ 5 = 12, 12 is a factor of 60.
As 60 ÷ 10 =6, 6 is a factor of 60.
As 6 is a factor of 60, therefore 3 a factor of 6 is also a factor of 60
so we will check only 4, 7, 8, 9,till the product of divisor and quotient is repeated ……..

$$
\begin{array}{r}
15 \\
4\overline{)60} \\
4 \\
\overline{20} \\
20 \\
\overline{0}
\end{array}
\qquad
\begin{array}{r}
8 \\
7\overline{)60} \\
56 \\
\overline{4}
\end{array}
\qquad
\begin{array}{r}
7 \\
8\overline{)60} \\
56 \\
\overline{4}
\end{array}
$$

Therefore 4 and 15 are factors of 60

Therefore 7 and 8 are not factors of 60

Stop here as the divisor and quotient are interchanged

Therefore, all factors of 60 are 1, 2, 3, 4, 5, 6, 10, 15, 20, 30 and 60.

Exercise 4.1

1. Write the first 5 multiples of 3
2. Write the first ten multiples of 10.
3. Write the first 7 multiples of 100.
4. Write the first 4 multiples of 1000
5. Encircle every alternate number beginning with 2 and answer the following:
   a) What are the encircled numbers called?
   b) What are the digits in one's place in these?
   c) Would it hold for numbers beyond 99?
   d) What are the numbers that are not encircled called?
   e) What are the digits in one's place in these?
   f) Would it hold for numbers beyond 99?
   g) Is 2 a factor of all the encircled numbers?
   h) Are all the encircled numbers multiples of 2?
6. Which of the following numbers are even?
   3, 6, 17, 20, 45, 64, 69
7. Which of the following numbers are odd?
   1, 63, 58, 57, 34, 91, 40
8. Would the sum of 2 even numbers be always even? If no, give a counter example.
9. Would the sum of 2 odd numbers be always even? If no, give a counter example.
10. Would the sum of an odd number and any even number be even? If no, give a counter example.
11. Which of the following numbers are multiples of 10?
    30, 45, 60, 74
12. a) Is 4 a factors of 13?
    b) Is 7 a factors of 56?
    c) Is 8 a factors of 56?
13. Experiment with numbers to find 3 numbers which when multiplied give 24?
14. Encircle every 5th number in the hundred table, and fill in the blanks in the following:
    a) These end in the digits _____
    b) All the encircled numbers are _____of 5.
    c) 5 is a _____ of all the encircled numbers.
15. Which of the following numbers are multiples of 5?
    43, 70, 54, 25

16. Encircle every 4th number and every 6th number in the hundred table. Were any of the numbers encircled twice? What does it mean?
17. Find all factors of
   a) 12   b) 10   c) 24   d) 17
18. Can 4 be a factor of an odd number?
19. If 3 is a factor of a number would 6 necessarily be a factor of that number? If no, give a counter example.
20. If 8 is a factor of a number would 4 necessarily be a factor of that number? If no, give a counter example.
21. Which of the numbers 23, 40, 25, 12, 5, 2, 30 have
   a) 2 as a factor and why?
   b) 5 as a factor and why?
   c) 10 as a factor and why?
22. Which of the numbers 23, 40, 25, 12, 5, 2, 30 will not have
   (a) 2 as a factor and why?
   (b) 5 as a factor and why?
   (c) 8 as a factor and why?
   (d) 10 as a factor and why

UNIT 5

Division

There are many situations in which we want to make equal groups of a given size from a number of objects and want to know how many groups would be there. For example,
There are 8 toffees and we wanted to give 2 toffees to each and we want to know how many children can have it. In this case we go on giving 2 toffees to each child till no toffees are left. How many children got it? - 4
There are other situations in which we need to share a number of objects equally among a given number of persons and we want to find the share of each person. For example,
There are 6 toffees and we wanted to distribute it equally between three children. How many toffees each child got?
We express these by $8 \div 2 = 4$ and $6 \div 3 = 2$
We read it as 8 divided by 2 is equal to 4, and 6 divided by 3 is equal to 2.
The number that is divided is called the **dividend,** the number by which it is divided is called the **divisor**, the number that results is called **quotient** and ÷ is the sign of division. For example, in $12 \div 4 = 3$, 12 is the dividend, 4 is the divisor and 3 the quotient.

Division facts
Division is the inverse of multiplication. In multiplication we are given the number of groups and group size and multiplication gives the total number of objects. Whereas in division we are given total number of objects, the group size or number of groups and we have to find the number of groups or group size. Verify

$7 \times 4 = 28$ $\qquad\qquad$ $28 \div 4 = 7$ $\qquad\qquad$ $28 \div 7 = 4$

The division facts that correspond to multiplication facts (multiplication of two one-digit numbers) are called division facts. We had learnt to find division facts by using many aids in class 3, we will review the use of sticks, repeated subtraction, use of a grid and multiplication only.

Use of sticks
Set aside as many sticks the total number of objects to be shared and make sets of size as the other number and count the number of sets. For example to find $12 \div 4$, set aside 12 sticks and make sets of 4 sticks and count the number of sets which is 3, therefore $12 \div 4 = 3$.
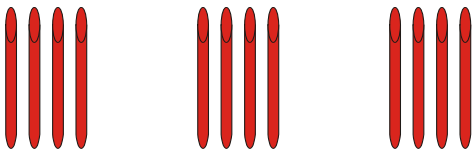
Repeated subtraction

To find 8 ÷ 2, we go on subtracting 2 till we reach 0 and count how many times we subtracted.

```
  8
- 2                    (1)
------
  6
- 2                    (2)
------
  4
- 2                    (3)
------
  2
- 2                    (4)
-----
  0
-----
```

As we could subtract 2 four times, 8 ÷ 2 = 4

Use of a rectangular model:

A 10 × 10 square with the help of a L-shaped cover can be used to find the division facts by exposing rows corresponding to the divisor and exposing columns one by one and counting the squares till you find as many squares as the dividend. The number of columns gives the quotient. For example to find 30 ÷ 6, we begin with exposing 6 rows and 1 column that exposes 6 squares, exposing two columns gives 12 squares, exposing 3 columns gives 18 squares and exposing 4 columns gives 24 squares and, exposing 5 columns gives 30 squares same as the dividend. As we need to expose 5 columns starting with as many rows as the divisor to get 30 square, therefore 30 ÷ 6 = 5.
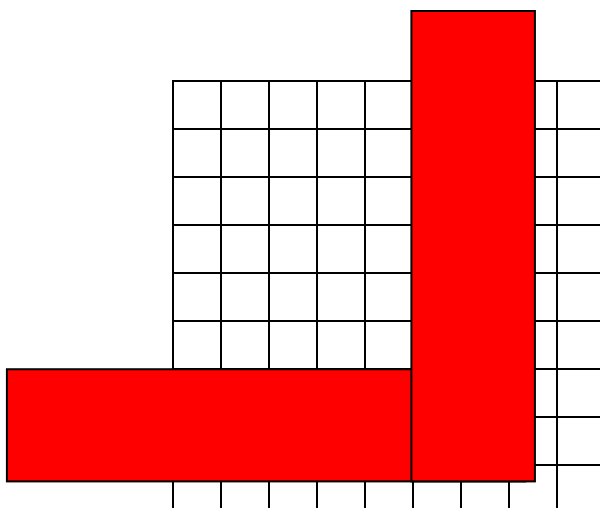
Use of Multiplication table

We can find the division facts from the multiplication table as follows:
Highlight the numbers in the row corresponding to the divisor till you
find the dividend and highlight the column above that cell. Read the
column number, it gives the quotient. For example, to find $56 \div 8$,
highlight the 8th row till you find the cell with 56, then highlight the
column above 56 and read the column number, which gives the quotient.
As the column number is 7, therefore $56 \div 8 = 7$.

Multiplication Table

×	0	1	2	3	4	5	6	7	8	9
0	0	0	0	0	0	0	0	0	0	0
1	0	1	2	3	4	5	6	7	8	9
2	0	2	4	6	8	10	12	14	16	18
3	0	3	6	9	12	15	18	21	24	27
4	0	4	8	12	16	20	24	28	32	36
5	0	5	10	15	20	25	30	35	40	45
6	0	6	12	18	24	30	36	42	48	54
7	0	7	14	21	28	35	42	49	56	63
8	0	8	16	24	32	40	48	56	64	72
9	0	9	18	27	36	45	54	63	72	81

Exercise 5.1

1. Write the division facts for the following against them:

```
  15
-  5
-----
  10
-  5
-----
   5
-  5
-----
   0
-----
```

<div style="border:1px solid #000; width:300px; height:120px;"></div>

```
   6
-  3
-----
   3
-  3
-----
   0
------
```

<div style="border:1px solid #000; width:300px; height:120px;"></div>

2. $7 \times 3 = 21$ $21 \div 3 =$ $21 \div 7 =$

    $8 \times 6 = 48$ $48 \div 6 =$ $48 \div 8 =$

    $5 \times 9 = 45$ $45 \div 9 =$ $45 \div 5 =$

    $9 \times 7 = 63$ $63 \div 7 =$ $63 \div 9 =$

    $6 \times 6 = 36$ $36 \div 6 =$

    $8 \times 7 = 56$ $56 \div 7 =$ $56 \div 8 =$

    $9 \times 9 = 81$ $81 \div 9 =$

3. Set aside 25 sticks and make sets of 5. How many sets of 5 sticks do you have? Write a mathematical sentence to show that.

5. Set aside 12 sticks and distribute these in 4 equal heaps of sticks. How many sticks are there in each heap? Write a mathematical sentence to show that.

6. If there are 10 laddoos and you want to give 2 laddoos to each person, how many persons can you give it to? Write a mathematical sentence to show that.

Use the multiplication table given in Activity sheet 5.1 to divide the following:

$8 \div 2 =$	$12 \div 4 =$	$9 \div 3 =$	$16 \div 4 =$
$14 \div 2 =$	$24 \div 6 =$	$18 \div 3 =$	$42 \div 7 =$
$14 \div 7 =$	$24 \div 8 =$	$56 \div 7 =$	$27 \div 9 =$
$30 \div 6 =$	$48 \div 6 =$	$63 \div 9 =$	$81 \div 9 =$

Division with a remainder
It is not always possible to make an exact number of equal groups of a given size from a number of objects. For example, if there are 23 sticks and we want to make sets of 4, after we have made 5 sets of 4 and used 20 sticks, 3 sticks are left over.
Here 23 is the dividend 5 the divisor and 4 the quotient and 3 is called a **remainder**. We can check if a division is correct by multiplying the divisor and quotient and adding the remainder to the product, it should be equal to the dividend $(5 \times 4) + 3 = 20 + 3 = 23$ the same as dividend.
Dividend = divisor × quotient + remainder.
Division of a two-digit number with one-digit- number with a remainder
We can find the quotient by thinking of the largest multiple of the divisor less than the quotient. The multiples of 5 are 5, 10, 15, 20, 25, ----- and the largest multiple less than the 23 is $5 \times 4 = 20$. The number 5 that multiplied by the divisor gives the highest multiple is the quotient.
We can find the remainder by subtracting the product of divisor and quotient from the dividend. In the above example the remainder $= 23 - (5 \times 4) = 23 - 20 = 3$.
Examples- Divide and verify the answers

$$\begin{array}{r} 2 \\ 6{\overline{)13}} \\ 12 \\ \overline{1} \end{array}$$

Verification of the answer

$(2 \times 6) + 1 = 13$

$$\begin{array}{r} 5 \\ 7{\overline{)36}} \\ 35 \\ \overline{1} \end{array}$$

Verification of the answer

$(5 \times 7) + 1 = 36$

$$\begin{array}{r} 7 \\ 4{\overline{)31}} \\ 28 \\ \overline{3} \end{array}$$

Verification of the answer

$(7 \times 4) + 3 = 31$

Exercise 5.2

1. Set aside 13 sticks and make sets of 3 sticks.
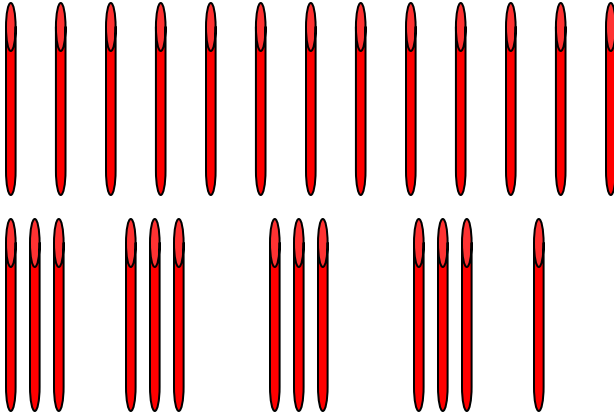
How many sets of 3 sticks were made – 4
How many sticks were used? -12
How many sticks were left? - 1
Write it in long division form

$$\begin{array}{r} 4 \\ 3\overline{)13} \\ 12 \\ \hline 1 \end{array}$$

2. Set aside 21 sticks and make sets of 4 sticks.
   How many sets of 4 sticks were made?
   How many sticks were used?
   How many sticks were left?
   Write it in long division form

3. Set aside 27 sticks and make sets of 5 sticks.
   How many sets of 5 sticks were made?
   How many sticks were used?
   How many sticks were left?
   Write it in long division form

4. Set aside 18 sticks and make sets of 6 sticks.
   How many sets of 6 sticks were made?
   How many sticks were used?
   How many sticks were left?
   Write it in long division form:

5. Set aside 21 sticks and make 4 equal heaps of sticks.

Could you distribute all sticks equally in 4 heaps? If no, how many sticks you could distribute equally?

How many sticks were left?

How many sticks were in each heap?

Write it in long division form:

6. Find the quotient and remainder for the sums given below and verify your answer:

$4\overline{)14}$

Quotient =   Remainder =

7. $3\overline{)16}$

Quotient =   Remainder =

8. $5\overline{)28}$

Quotient =   Remainder =

9. $4\overline{)32}$

Quotient =   Remainder =

10. $7\overline{)37}$

Quotient =   Remainder =

Division of two-digit numbers by one digit number with two-digit quotient

We can divide two-digit numbers by one-digit number by using sticks. Recall we represent a ten stick by a thicker stick and a one stick by a thin stick with the rule that we can exchange one ten-sticks for 10 one-sticks. This is similar to exchanging 1 ten-rupee note for 10 one-rupee notes. For example,

1 stick

10 sticks.

To divide a two-digit numbers by one-digit number in which the number of tens is greater than the divisor

1. We set aside as many sticks as the dividend using ten-sticks and one-sticks.

2. We distribute the ten-sticks equally in as many heaps as the divisor and find out how many ten-sticks have been used and how many are left over.
3. We then exchange the left over ten-sticks with one-sticks and combine them with one-sticks that are there.
4. Distribute these equally in the heaps made for ten-sticks.
5. The number of sticks in each heap gives the quotient.
6. The left over one-sticks gives the remainder.

Demonstrate it for $3\overline{)46}$, $7\overline{)87}$, $4\overline{)50}$.

We can also do it in the head for say by $3\overline{)46}$

1. Looking at tens and find highest multiple of the divisor less than the number of tens- $1\times 3 = 3$ tens, $2 \times 3 = 6$ tens > 4 tens.
2. The number of tens in the quotient is the number that multiplied by the divisor gives the highest multiple in this case 1 and we write it in ten's place in the quotient
3. Now 3 tens have been used 1 ten is left. We rename it as 10 ones and combine it with 6 ones to have 16 ones.
4. Find highest multiple of the divisor less than 16 - $1\times 3 =3$, $2\times 3 =6$, $3\times 3 =9$, $4 \times 3 = 12$, $5 \times 3 = 15$, $6 \times 3 =18 > 16$. The number that multiplied by the divisor gives the highest multiple gives the number of ones in the quotient in this case 5. We write it in one's place in the quotient. Thus the quotient is 15.
5. Subtract the product of the ones in the quotient and divisor from the ones to find the remainder $16 - 15 = 1$.
   We can write it in long form as follows

$$
\begin{array}{r}
15 \\
3\overline{)46} \\
3 \\
\overline{16} \\
15 \\
\overline{1}
\end{array}
$$

We can again verify the answer by checking if the quotient × divisor + remainder = dividend.
As $(15 \times 3) + 1 = 45 + 1 = 46$, the answer is correct.

Examples

$$\begin{array}{r} 12 \\ 4\overline{)50} \\ \underline{4} \\ 10 \\ \underline{8} \\ 2 \end{array}$$

Verification of the answer $(12 \times 4) + 2 = 48 + 2 = 50$

$$\begin{array}{r} 10 \\ 5\overline{)52} \\ \underline{5} \\ 02 \\ \underline{0} \\ 2 \end{array}$$

Verification of the answer $(10 \times 5) + 2 = 50 + 2 = 52$

Division of three-digit numbers by one-digit number

We can divide three-digit numbers by one-digit number by using sticks. Recall we represent hundred sticks by a thick stick, a ten stick by a thinner stick and a one stick by the thinnest stick e.g.

1 stick

10 sticks

100 sticks

with the rule that 10 one sticks can be exchanged with one ten-stick and 10 ten-sticks can be exchanged with 1 hundred-stick.

To divide a three-digit numbers by one-digit number,

1. We set aside as many sticks as the dividend using hundred-sticks, ten-sticks and one-sticks.
2. If the number of hundred-sticks is greater than the divisor, we distribute the hundred-stick equally in as many heaps as the divisor and find out

how many hundred-stick have been left over. The number of hundred-sticks in each heap gives the number of hundreds in the quotient.

3. We then exchange the left over hundred-sticks with 10 ten-sticks and combine them with ten-sticks that are there and distribute these equally in the heaps made for hundred-sticks and the left over ten-sticks. The number of ten-sticks in each heap gives the number of tens in quotient.

4. If the number of hundred-sticks is less than the divisor, we exchange those with ten-sticks and combine them with ten-sticks that are there. We then distribute these equally as many heaps as the divisor and find the left over ten-sticks. The number of ten-sticks in each heap gives the number of tens in quotient.

5. We then exchange the left over ten-sticks with 10 one-sticks, combine them with one-sticks that are there and distribute these equally in the heaps made earlier and find the left over one-sticks. The number of one-sticks in each heap gives the number of ones in quotient and left over sticks gives the remainder.

Demonstrate it for $3\overline{)446}$, $4\overline{)687}$ and $6\overline{)634}$.

We can also do it for $3\overline{)446}$, by the following procedure:

1. Look at hundreds and find highest multiple of the divisor less than the number of hundreds - 3×1 hundred $= 3$ hundreds, 3×2 hundreds$= 6$ hundreds > 4 hundreds. The number that multiplied by the divisor gives the highest multiple is the number of hundreds in the quotient 1 in this case and we write it in hundred's place in the quotient. We write the product 3 below 4 the hundreds the hundreds in the dividend and subtract it from that and write 1 the difference below that after drawing a line. We rename 1 hundred as 10 tens and combine it with 4 tens in the dividend by writing 4 to the right of 1 to indicate we have 14 tens.

2. We next find the highest multiple of the divisor with tens less than the number of tens left in the dividend- 3×1 ten $= 3$ tens, 3×2 tens $= 6$ tens, 3×3 tens $= 9$ tens, 3×4 tens $= 12$ tens, 3×5 tens $= 15$ tens > 14 tens. The number that multiplied by the divisor gives the highest multiple is the number of tens in the quotient 4 in this case and we write it in ten's place in the quotient. We write the product 12 below 14 the tens and subtract it from that and write 2 the difference below that after drawing a line. We rename 2 tens as 20 ones and combine it with 6 ones in the dividend by writing 6 to the right of 2 to indicate we have 26 ones.

3. Find highest multiple of the divisor less than 26 - $3 \times 1 = 3$, $3 \times 2 = 6$, $3 \times 3 = 9$, $3 \times 4 = 12$, $3 \times 5 = 15$, $3 \times 6 = 18$, $3 \times 7 = 21$, $3 \times 8 = 24$, $3 \times 9 = 27$

>26. The number that multiplied by the divisor gives the highest multiple less than the number of ones left over in the dividend is the number of ones in the quotient 8 in this case, we write it in one's place in the quotient. Thus the quotient is 148.

4. Subtract the product of the ones in the quotient and divisor from the ones to find the remainder $26 - 24 = 2$.

We can write it in long form as follows:

```
      148
   3)446
      3
     ___
      14
      12
     ___
      26
      24
     ___
       2
```

Verification of the answer

```
    148
  ×   3
  --------
    444
  +   2
  -------
    446
  -------
```

If the number of hundreds is less than the divisor remember to start writing the quotient in ten's place. And if the number of tens and/or ones is less than the divisor remember to write 0 in ten's place and/or one's place.

Examples

```
      140
   4)560
      4
     ___
      16
      16
     ___
       0
```

Verification of the answer

```
    140
  ×    4
  -------
    560
  --------
```

```
      52
   6)317
      30
     ___
      17
      12
     ___
       5
```

Verification of the answer

```
     52
   ×  6
   -------
    312
   +   5
   -------
    317
   -------
```

73

Exercise 5.3

1. In $9\overline{)74}$ write
$$\begin{array}{r} 8 \\ 9\overline{)74} \\ 72 \\ \hline 2 \end{array}$$

   the dividend
   the divisor
   the quotient
   the remainder-

2. Set aside 45 sticks using ten-sticks and one-sticks and distribute them equally in 3 heaps, starting with ten-sticks.
   How many ten-sticks you could place in each heap?
   How many ten-sticks were used?
   How many ten-sticks were left?
   Exchange left over ten-sticks for one-sticks and combine these with one-sticks.
   How many one-sticks do you have?
   Distribute these equally in 3 heaps made earlier. How many one-sticks you could distribute in each heap?
   How many one-sticks were used?
   How many one-sticks were left?
   Write it in long division form.

3. Set aside 27 sticks using ten-sticks and one-sticks and distribute them equally in 5 heaps, starting with ten-sticks.
   How many ten-sticks you could place in each heap?
   How many ten-sticks were used?
   How many ten-sticks were left?
   Exchange left over ten-sticks for one-sticks and combine these with one-sticks.
   How many one-sticks do you have?
   Distribute these equally in 5 heaps made earlier. How many one-sticks you could distribute in each heap?
   How many one-sticks were used?
   How many one-sticks were left?
   Write it in long division form.

4. Set aside 69 sticks using ten-sticks and one-sticks and distribute them equally in 6 heaps, starting with ten-sticks.
   How many ten-sticks you could place in each heap?

How many ten-sticks were used?
How many ten-sticks were left?
Exchange left over ten-sticks for one-sticks and combine these with one-sticks.
How many one-sticks do you have?
Distribute these equally in 6 heaps made earlier. How many one-sticks you could distribute in each heap?
How many one-sticks were used?
How many one-sticks were left?
Write it in long division form.

5. Set aside 23 sticks using ten-sticks and one-sticks and distribute them equally in 4 heaps, starting with ten-sticks.
How many ten-sticks you could place in each heap?
How many ten-sticks were used?
How many ten-sticks were left?
Exchange left over ten-sticks for one-sticks and combine these with one-sticks.
How many one-sticks do you have?
Distribute these equally in 4 heaps. How many one-sticks you could distribute in each heap?
How many one-sticks were used?
How many one-sticks were left?
Write it in long division form.

6. Set aside 451 sticks using hundred-sticks, ten-sticks and one-sticks and distribute them equally in 2 heaps, starting with hundred-sticks.
How many hundred-sticks you could place in each heap?
How many hundred-sticks were used?
How many hundred-sticks were left?
Exchange left over hundred-sticks for ten-sticks, how many ten-sticks do you have?
Distribute these equally in heaps made earlier. How many ten-sticks you could distribute in each heap?
How many ten-sticks were used?
How many ten-sticks were left?
Exchange left over ten-sticks with one-sticks, how many one-sticks do you have?
Distribute these equally in heaps made earlier. How many one-sticks you could distribute in each heap?
How many one-sticks were used?
How many one-sticks were left?

How many sticks are there in all in each heap?
How many sticks are left over?
Write it in long division form.

7. Set aside 531 sticks using hundred-sticks, ten-sticks and one-sticks and distribute them equally in 4 heaps starting with hundred-sticks.
How many hundred-sticks you could place in each heap?
How many hundred-sticks were used?
How many hundred-sticks were left?
Exchange left over hundred-sticks for ten-sticks, how many ten-sticks do you have?
Distribute these equally in heaps made earlier. How many ten-sticks you could distribute in each heap?
How many ten-sticks were used?
How many ten-sticks were left?
Exchange left over ten-sticks with one-sticks, how many one-sticks do you have?
Distribute these equally in heaps made earlier. How many one-sticks you could distribute in each heap?
How many one-sticks were used?
How many one-sticks were left?
How many sticks are there in all in each heap?
How many sticks are left over?
Write it in long division form.

8. Set aside 721 sticks using hundred-sticks, ten-sticks and one-sticks and distribute them equally in 5 heaps starting with hundred-sticks.
How many hundred-sticks you could place in each heap?
How many hundred-sticks were used?
How many hundred-sticks were left?
Exchange left over hundred-sticks for ten-sticks, how many ten-sticks do you have?
Distribute these equally in heaps made earlier. How many ten-sticks you could distribute in each heap?
How many ten-sticks were used?
How many ten-sticks were left?
Exchange left over ten-sticks with one-sticks, how many one-sticks do you have?
Distribute these equally in heaps made earlier. How many one-sticks you could distribute in each heap?
How many one-sticks were used?
How many one-sticks were left?

How many sticks are there in all in each heap?
How many sticks are left over?
Write it in long division form.

9. Set aside 631 sticks using hundred-sticks, ten-sticks and one-sticks and distribute them equally in 6 heaps starting with hundred-sticks.
How many hundred-sticks you could place in each heap?
How many hundred-sticks were used?
How many hundred-sticks were left?
Exchange left over hundred-sticks if any for ten-sticks, how many ten-sticks do you have?
Distribute these equally in heaps made earlier. How many ten-sticks you could distribute in each heap?
How many ten-sticks were used?
How many ten-sticks were left?
Exchange left over ten-sticks with one-sticks, how many one-sticks do you have?
Distribute these equally in heaps made earlier. How many one-sticks you could distribute in each heap?
How many one-sticks were used?
How many one-sticks were left?
How many sticks are there in all in each heap?
How many sticks are left over?
Write it in long division form.

10. Set aside 721 sticks using hundred-sticks, ten-sticks and one-sticks and distribute them equally in 7 heaps.
How many hundred-sticks you could place in each heap?
How many hundred-sticks were used?
How many hundred-sticks were left?
Exchange left over hundred-sticks for ten-sticks, how many ten-sticks do you have?
Distribute these equally in heaps made earlier. How many ten-sticks you could distribute in each heap?
How many ten-sticks were used?
How many ten-sticks were left?
Exchange left over ten-sticks with one-sticks, how many one-sticks do you have?
Distribute these equally in heaps made earlier. How many one-sticks you could distribute in each heap?
How many one-sticks were used?
How many one-sticks were left?

How many sticks are there in all in each heap?
How many sticks are left over?
Write it in long division form.

11. Set aside 341 sticks using hundred-sticks, ten-sticks and one-sticks and distribute them equally in 9 heaps.
How many hundred-sticks you could place in each heap?
How many hundred-sticks were used?
How many hundred-sticks were left?
Exchange left over hundred-sticks for ten-sticks, how many ten-sticks do you have?
Distribute these equally in heaps made earlier. How many ten-sticks you could distribute in each heap?
How many ten-sticks were used?
How many ten-sticks were left?
Exchange left over ten-sticks with one-sticks, how many one-sticks do you have?
Distribute these equally in heaps made earlier. How many one-sticks you could distribute in each heap?
How many one-sticks were used?
How many one-sticks were left?
How many sticks are there in all in each heap?
How many sticks are left over?
Write it in long division form

12. Set aside 843 sticks using hundred-sticks, ten-sticks and one-sticks and distribute them equally in 8 heaps.
How many hundred-sticks you could place in each heap?
How many hundred-sticks were used?
How many hundred-sticks were left?
Exchange left over hundred-sticks for ten-sticks, how many ten-sticks do you have?
Distribute these equally in heaps made earlier. How many ten-sticks you could distribute in each heap?
How many ten-sticks were used?
How many ten-sticks were left?
Exchange left over ten-sticks with one-sticks, how many one-sticks do you have?
Distribute these equally in heaps made earlier. How many one-sticks you could distribute in each heap?
How many one-sticks were used?
How many one-sticks were left?

How many sticks are there in all in each heap?
How many sticks are left over?
Write it in long division form

Exercise 5.4

Divide the following and verify your answer:

1. $4\overline{)50}$ $3\overline{)73}$ $7\overline{)81}$

2. $6\overline{)72}$ $4\overline{)87}$ $8\overline{)64}$

3. $2\overline{)531}$ $8\overline{)941}$ $6\overline{)821}$

4. $9\overline{)213}$ $5\overline{)456}$ $7\overline{)803}$

5. $7\overline{)743}$ $3\overline{)450}$ $4\overline{)423}$

6. $9\overline{)213}$ $5\overline{)456}$ $7\overline{)803}$

7. $8\overline{)843}$ $4\overline{)323}$ $8\overline{)721}$

Exercise 5.5

1. If there are 36 eggs, and you want to pack those in cartons that can hold 6 eggs. How many egg cartons are needed?
2. A cash prize of 500 rupees was distributed equally among 5 participants in a dance. How much money did each participant get?
3. A class has 44 students. These are assigned equally to 4 houses of the school. How many students from that class are in each house?
4. Kamal had a 50-rupees note and he wants to buy notebooks each costing 8 rupees. Find the maximum number of notebooks he can buy and the money the shopkeeper should return to him?
5. Five persons can be seated in a car. If 28 persons want to go for a picnic, how many cars would be needed?
6. Awani bought a bag of sweets to distribute to her classmates on her birthday. The bag contained 63 sweets, she gave 2 sweets to each and 5 sweets were left over. How many children were present that day?
7. Make up stories that require the following calculations:

   $4 \div 2$

   $12 \div 4 =$

   $30 \div 6 =$

   $20 \div 5 =$

   $24 \div 12$

UNIT 6

Fractions

Concept of equal and unequal parts

The shapes given below are divided into two parts by a dashed line, mark a √ under the shapes in which the two parts are equal.
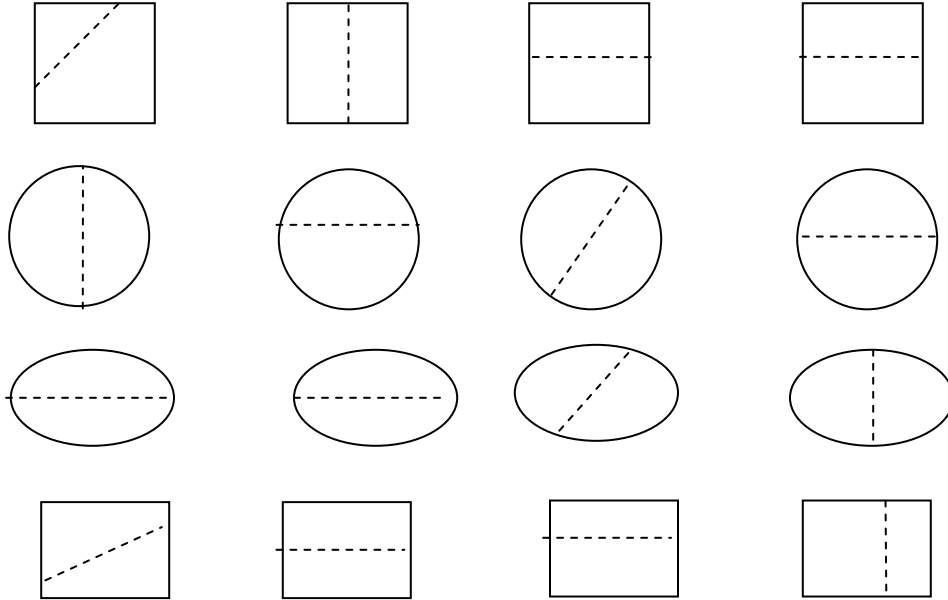
Regional model

If we can divide a region into two equal parts, then each part is one-half of the original regions. We can also write one-half as $\frac{1}{2}$ or 1/2. The bottom number tells in how many parts a whole is divided into and the tops number the parts we are considering.
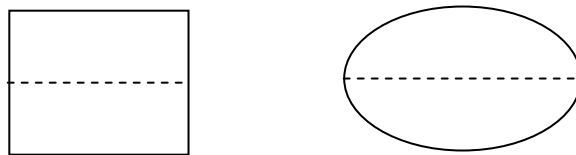
If we can divide a region into four equal parts, each part is one-fourth of the original region, which is taken to be one. We can also write one-fourth as $\frac{1}{4}$

or 1/4. The bottom number tells in how many parts a whole is divided into and the tops number the parts we are considering. If we consider two parts we have two-fourths or $\frac{2}{4}$ or 2/4. If we consider three parts we have three-fourths or $\frac{3}{4}$ or 3/4. All the parts or $\frac{4}{4}$ or 4/4 make a whole.
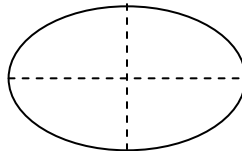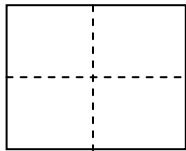
Examples
The fraction under each of the figures shows the part of the whole region that is shaded

1/2

1/4
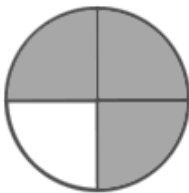
3/4

Exercise 6.1

1. Cut the shapes given in Activity Sheet 6.1 and fold and cut these so that two parts cover each other exactly. How much is each part?
2. Shade or colour one-half of the figures given below:
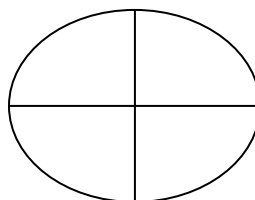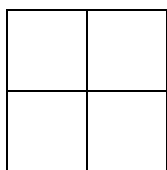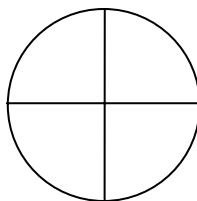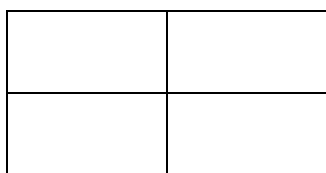
3. Trace and cut the following shapes and fold these so that two parts cover each other exactly. If you can fold it in many ways, do it. Shade half of these.
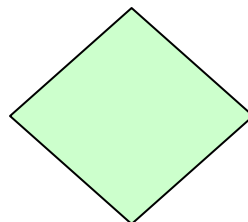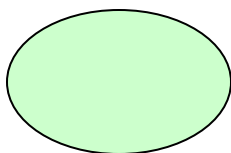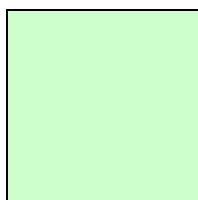
3. Shade or colour one-half of the figures given below
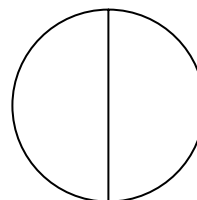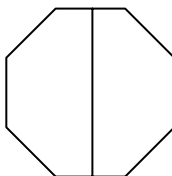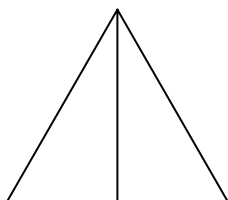
4. Trace and cut the following shapes. Fold these so that two parts cover each other exactly. Fold these again so that two parts cover each other exactly. Open the paper and shade one-fourth of the shape.
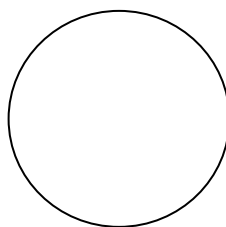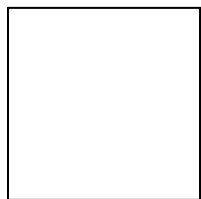
5. Trace and cut the following shapes. Fold these so that two parts cover each other exactly. Fold these again so that two parts cover each other exactly. Open the paper and shade two-fourths of the cut shape.
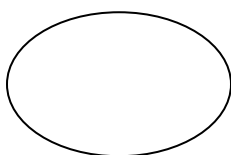
6. Trace and cut the following shapes. Fold these so that two parts cover each other exactly. Fold these again so that two parts cover each other exactly. Open the paper and shade three-fourths of the cut shape.
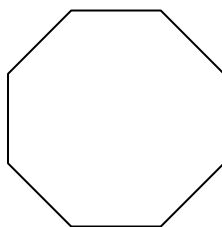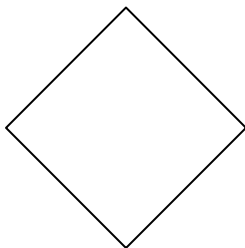
7. Shade or colour one-fourth of the figures given below
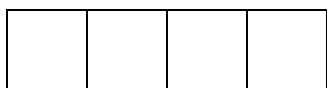
8. Shade or colour two-fourth of the figures given below

9. Shade or colour three-fourth of the figures given below

10.Shade or colour half of the figures given below
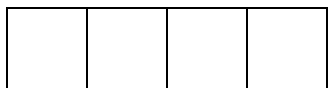
11.Is two fourth of the region the same as one-half of the region?

Set Model
Half
If we can divide a number of objects say 6 sticks into two heaps so that each heap has the same number of sticks 3 in this case we say each heap contains one-half of the number of sticks in the original collection or 3 is one-half of 6. This is the same as dividing by 2. Thus we can find one-half of the objects by dividing the number of objects by 2.
Fourths
If we can divide a number of objects say 16 sticks into four heaps so that each heap has the same number of sticks 4 in this case we say each heap contains one-fourth of the number of sticks in the original collection or 4 is one-fourth of 16. This is the same as dividing by 4. Thus we can find one-fourth of the objects by dividing the number of objects by 4. Two- fourths of sticks can be found by counting the number of sticks in two heaps which is 8. Therefore two-fourth of 16 is 8-the same as half of 16. Three- fourths of sticks can be found by counting the number of sticks in three heaps. Therefore three-fourth of 16 is 12.
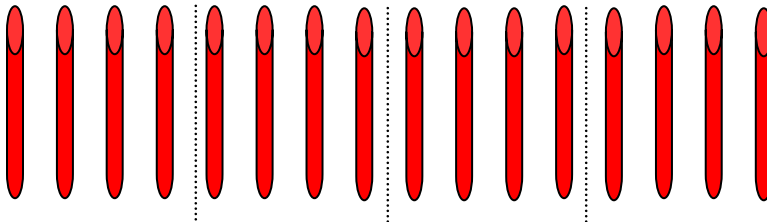
Exercise 6.2

1. Divide the following into two equal heaps:
   2 sticks or blocks.
   4 sticks or blocks
   6 sticks or blocks.
   8 sticks or blocks.
   3 sticks or blocks

2. Shade half of the objects in these collections

   ○ ○ ○ ○ ○ ○

   ○ ○ ○
   ○ ○ ○

   ○ ○ ○ ○
   ○ ○ ○ ○

4. Set aside 10 sticks and find half of 10 sticks.

5. Set aside 20 sticks and find half of 20 sticks.

6. Find one-fourth of 20 sticks.

7. Find two-fourth of 20 sticks.

8. Is two-fourth of 20 sticks the same as one-half of 20 sticks?

9. Find three-fourth of 20 sticks.

10. Shade one-fourth of the objects in the collections given below:

    ○ ○ ○ ○

11. Shade two-fourths of the objects in the collections given below:

    ○ ○ ○ ○ ○ ○ ○ ○

○　○　○　○
○　○　○　○
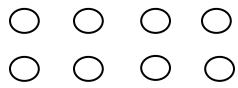
12. Shade three-fourths of the objects in the collections given below:

○　○　○　○　○　○　○　○

○　○　○　○
○　○　○　○
○　○　○　○
○　○　○　○
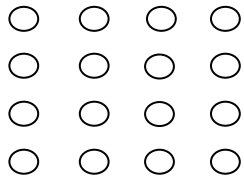
Fractions linear regional model

Cut out 4 strips from Activity Sheet 6.2.

The strip (a) represents one whole. Write "one whole" on the fraction strip.

Pick strip (b), fold it, and cut it into two equal pieces. How much is each strip? (1/2)

Label the strips using both the word and the fractional representation.

How much are two strips? (2/2).

Pick the blue strip, fold it, and cut it into four equal pieces. How much is each strip? (1/4).

Label the strip using both the word and the fractional representation

How much are two strips? (2/4).

How much are three strips? (3/4).

Is the length of two fourths of the strip the same as half of the strip? Check by folding strip (c) once to find one-half of the strip and folding strip (d) twice to find two-fourths and comparing their length.

When two strips are of the same length, they represent equivalent fractions.

Exercise 6.3

What parts of the following strips are shaded? Write against them:

(a)

(b)

(c)

(d)
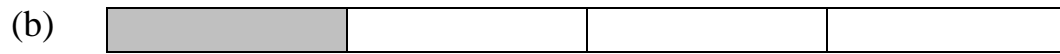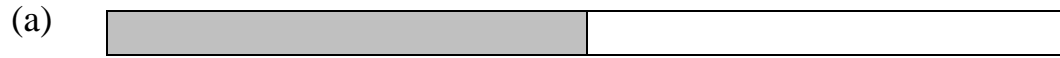
1. What do you notice about the fractions that are the same as 1/2?
2. Divide a rope into two equal parts.
3. Divide a rope into four equal parts.

UNIT 7

Money

Review

1. In what denomination (The worth of a note) is money available?
2. How many paise are there in a rupee?
3. Convert the following rupees to paise:

    5 rupees = _____ paise

    1 rupee and 40 paise = _____ paise

    6 rupees and 60 paise = _____ paise
4. Convert the paise given below to rupees:

    400 paise = _____ rupees

    600 paise = _____ rupees

    125 paise = _____ rupees and _____paise

    470 paise = _____ rupees
5. Write the following amounts of money in short form:

    (a) 3 rupees and 35 paise

    (b) 7 rupees and 50 paise

    (c) 4 rupees and 5 paise

Rounding off to nearest rupee

The paise used to come in the denomination of 1 paisa, 2 paise, 5 paise, 10 paise, 20 paise, 25 paise and 50 paise. But because of inflation, they are not used anymore. However, the prices of many things do involve paise; these are rounded to nearest rupee for buying and selling. If the price of something involves rupees and paise, we pay only the rupees part if paise are less than 50; and pay one rupee more if paise are more than or equal to 50 paise,

For example if the prices of different things are as follows, we pay the amount shown against them:

Rs 15.75 → Rs 16

Rs 56.25 → Rs 56

Rs 331.65 → Rs 332

Rs 140.50 → Rs 141

Shopping

When we do shopping, we often need to add and subtract money, and multiply or divide it by a number or do more than one of these to find out how much money to pay the shopkeeper.

If we express the money in short form, we can add and subtract money as in numbers. Always write the rupees with two digits after the dot. If 1 to 9 paise are involved, write it as 01, 02, 03… after the dot and if no paise are involved write two zeros after the dot e.g. Rs 35 as 35.00.

We can also multiply rupees and paise by a number as in numbers remembering to write the dot after two digits from the right if paise are involved.

We can also divide rupees and paise by a number as in numbers remembering to write the rupees with two zeros after the dot if no paise are involved and a dot after dividing the rupees in the quotient

Example 1

Anita bought a chocolate costing Rs 7.50, a packet of potato chips for Rs 12 and a cold drink for Rs 10. How much money should she give to the shopkeeper?

She should give to the shopkeeper

```
    Rs   7.50
    Rs 12.00
   +Rs 10.00
    -------------
    Rs 29.50
    -------------
```

Example 2

Rajan has 65 rupees and Sanjay has 100 rupees. How much more money does Sanjay have than Rajan?

Sanjay has

```
  Rs 100
- Rs   65
-----------
=Rs   35 more than Rajan
-----------
```

Example 3

The cost of an apple is Rs 4.50 rupees. If Raman has 30 rupees, does he have enough money to buy 6 apples?

The cost of 6 apples is

```
  Rs   4.50
×         6
  -----------
  Rs 27.00 = Rs 27.
  -----------
```

As Raman has 30 rupees, he has enough money to buy 6 apples.

or you can estimate it quickly as 30 ÷ 6 = 5 and the cost of an apple is less than rupees 5, Raman has enough money to buy them.

Example 4

Sunita bought potatoes worth 7 rupees and 50 paise, onions worth 10 rupees and tomatoes worth 5 rupees and 50 paise and bean for Rs 6. How much money she should pay the vegetable vendor?

The cost of vegetables Sunita bought is

```
  Rs   7.50
  Rs 10.00
  Rs   5.50
+Rs   6.00
-------------
=Rs 29.00
-------------
```

If she pays the vendor a 50-rupee-note, how much money should he return to her?

The vendor should return to her

```
  Rs 50
- Rs 29
---------
=Rs 21
---------
```

Example 5

Aditya bought 6 bananas. If a banana costs 1 rupee and 25 paise, how much money did he spend on bananas?

Aditya spent

```
  Rs 1.25
×       6
 ----------
  Rs.7.50
 ---------
```

If he also bought a watermelon costing 24 rupees. How much money did he spend in all?

He spent

```
  Rs.   7.50
+Rs   24.00
 ------------
  Rs   31.50 in all.
 ------------
```

Example 6

Six friends decided to go to a movie, if the total cost of tickets for all of them Rs 420, how much should each pay?
Each should pay 70 rupees, as

```
      70
6)420
   42
   ----
    0
   ----
```

Example 7
If the cost of 12 pencils is Rs 18, how much is the cost of
(a) 1 pencil?
(b) 3 pencils
(a)The cost of 1 pencil is
Rs 18 ÷ 12 = Rs 1.50, as

```
       1.50
12)18.00 .
    12
    ----
    6.0
    6.0
    -----
     0
    -----
```

(b) The cost of 3 pencils is
Rs 1.50 × 3

```
  Rs 1.50
×      3
  --------
  Rs 4.50.
  -------
```

Exercise 7.1

1. How many paise coins does a rupee have?
2. How many 10-rupee notes would you get for a hundred-rupee note?
3. How many 20-rupee notes you should get for a hundred-rupee note?
4. Convert the paise given below to rupees:

   300 paise = _____ rupees

   125 paise = _____ rupees and _____ paise

   470 paise = _____ rupees and _____ paise
5. Convert the following rupees to paise:

   3 rupees = _____ paise

   7 rupee and 20 paise = _____ paise

   7 rupees and 56 paise = _____ paise
6. Write the following amounts of money in short form:

   (a) 3 rupees and 35 paise

   (b) 7 rupees and 50 paise

   (c) 4 rupees and 5 paise

   (d) 100 rupees
7. Round off the following to the nearest rupee:

   46 rupees and 25 paise

   18 rupees and 72 paise

   104 rupees and 50 paise
8. Bilal had 50 rupees. He bought a toy costing 26 rupees. How much money is left with him?
9. Gita bought a chocolate costing Rs 5.50, a cake costing Rs 12 and potato chips costing 10 rupees.

   (a) How much money she should give to the shopkeeper?

   (b) If she gave a 50-rupee note to the shopkeeper, how much money he should return to her?
10. Suman has 25 rupees and her brother has 100 rupees. How much more money does her brother have?
11. Ranjana bought potatoes worth Rs 12.50, onions worth 15 rupees and tomatoes worth 6 rupees and 50 paise.

    (a) How much money she should pay the vegetable vendor?

    (b) If she pays the vendor a 100-rupee note, how much money should the vendor return to her?
12. A 100-gm tube of toothpaste costs Rs 7.

    (a) What would be the cost of 200 gram of toothpaste?

    (b) If 200-gm toothpaste costs Rs 12, how much do you save by buying the 200-gram tube of toothpaste?

96

13. If oranges are Rs 36 a dozen (1 dozen = 12), what will be the cost of
    (a) 1 orange
    (b) 4 oranges
14. The price of potatoes is Rs 16 per kg, what would be the cost of
    (a) 3 kg of potatoes?
    (b) $\frac{1}{2}$ kg of potatoes?
    (c) $\frac{1}{4}$ kg of potatoes?
    (d) $2\frac{1}{2}$ kg of potatoes?
15. How does a shopkeeper use the following operations in his daily work:
    (a) addition
    (b) subtraction
    (c) multiplication
    (d) division
    (e) fractions

UNIT 8

Length

We often need to measure length, height or distance of objects. The standard unit for measuring length is a **metre**; we write it in short form as m. You would have seen a cloth merchant measuring lengths of cloth with it. There are 10 equally spaced markings on it; the distance between two adjacent markings is one **decimetre**. We write it in short form as dm. A tailor needs more precision; so, he uses a metre tape to take measurements for stitching. A tape has 100 equally spaced markings numbered 1 to 100 on the tape. The distance between two adjacent markings is one **centimetre**. We write it in short form as cm. A metre is the same length as 100 cm. A decimetre = 10 cm. Decimetres are generally not used in day to day life.

Show children a metre by showing a metre rod or a metre long stick and ask children to make a list of five things that are about a metre long, more than a metre long and less than a metre long.

Show children a tape marked in m and cm and ask them to measure the length and width of a room, length of a black board, teacher's table.

Centimetre ruler

We can use a 15 or 30 centimetre ruler to measure length of small objects such as pencil, notebook, nail, pen and brush by keeping these in a horizontal or vertical position and marking lines at the end of these. Then keep the ruler in the same position with zero at one of the lines and read the ruler marking of the other line.
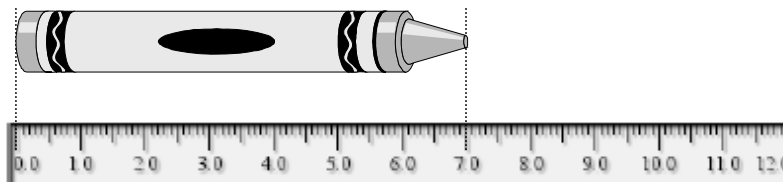
The length of the crayon is 7 cm.

Measuring to the nearest centimetre

If the thing that you may want to measure does not have a number marked above the second edge but falls between two numbers, then take the number that is nearer to it as its measure. It is called measuring to the nearest centimetre. If it falls exactly in the middle of two numbers, we take the larger number as its measure to the nearest centimetre.
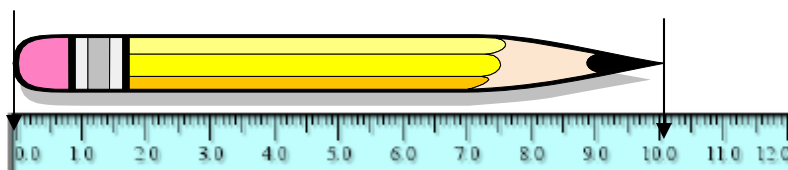
For example, the length of the pencil is between 10 and 11 cm, but it is closer to 10 cm, we therefore say its length to the nearest centimeter is 10 cm.

Measuring to the nearest milliimetre

The rulers also have finer markings between cm. Note that each centimetre has 10 equally spaced smaller markings, each of which is called a **milliimetre**. We write it in short form as mm. A centimetre is the same as 10 millimetres. We can thus convert centimetres into millimetres by multiplying the centimetres by 10, thus 2cm = 20 mm, 3 cm = 30 cm, 4cm = 40 mm and so on.

We can measure a length more accurately by reading the millimetres markings and writing it after the centimetre.
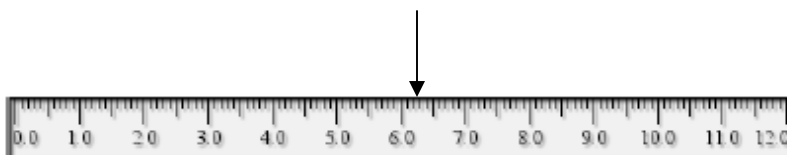
The arrow points to the third marking after 6 cm, we read it as 6 cm 3 mm.

Measurement of curved lines or distances around objects with curved edges

A ruler cannot be used for measuring curved lines such as ones given below. You can measure these by keeping a string over these and then measure the length of the string by using a ruler.
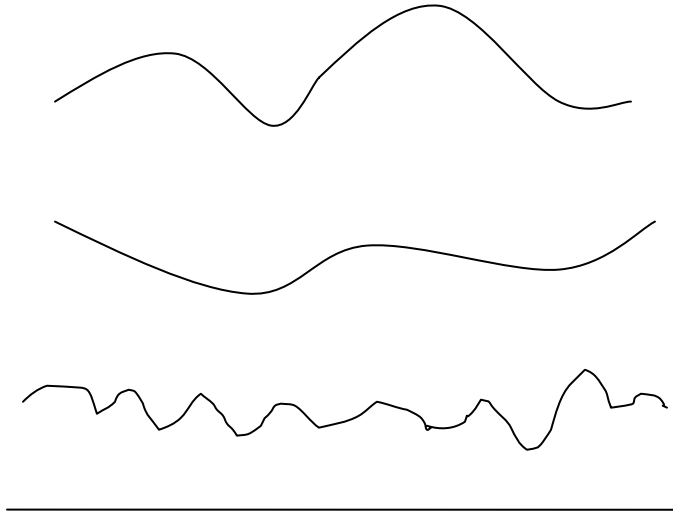
Exercise 8.1

1. How many centimetres are there in a metre?
2. How many millimetres are there in a centimetre?
3. Convert the following to millimeters:
   (a) 2 cm   (b) 5 cm   (c) 4 cm 4 mm
   (d) 8 cm 7 mm   (e) 9 cm 1 mm   (f) 10 cm 7 mm
4. What units you would use for measuring the length of the following objects-metre or centimetre?
   (a) a chalk   (b) a black board   (c) a pencil
   (d) a match box   (e) a tooth brush   (f) a room
5. Put the string around your thumb.
   Double the thumb length by folding the string and check if it fits your wrist.
   Double the wrist length by folding the string and check if it fits your neck.
   Double the neck length by folding the string and check if it fits your middle.
   If you find these fit, complete the following:
   (a) 1 wrist   = ___ thumbs.
   (b) 1 neck   = ___ thumbs.
   (c) 1 middle = ___ thumbs.

6. Measure the length of the line segments given below to the nearest centimetre.

   (a) ————————————

   (b) ——————————————————

   (c) ————————————————

   (d) ————————————————————

   (e) ——————————

   (f) ————

7. Measure the length of the following objects to the nearest centimetre:
   (a) a new crayon   (b) mathematics notebook   (c) a new pencil
   (d) a ten-rupee note   (e) mathematics book   (f) a match box
8. On the scale given in Activity Sheet 8.1 draw arrows to show the following:
   (a) 3 cm   (b) 6 cm 5 mm   (c) 3 cm 3 mm   (d) 10 cm 8 mm
9. Draw line segments whose lengths are given below:
   (a) 1 cm
   (b) 3 cm
   (c) 5 cm 4 mm
   (d) 7 cm 2 mm
10. Using the edge of your book draw lines that you think are 6, 8. 12 cm long. Under each of your line-segments, draw lines with the help of a ruler that is as long as the line-segment was supposed to be. Were your line-segments too large or too short? Can you do better next time?
11. Measure the lines given below using a string first and then find out length of the string to the nearest centimetre by the ruler.

(a)

(b)

(c)

(d)
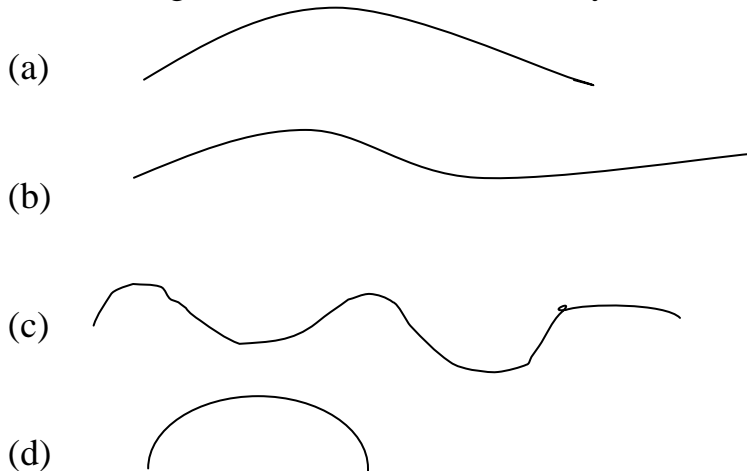
12. A metre is about the height of a
    A. a door   B. a table   C. a chair
13. A centimetre is about the
    A. width of a paper clip   B. width of a pencil sharpener
14. A milliimetre is about the
    A. thickness of a rupee coin   B. thickness of a pencil sharpener
15. The height of a very tall man in cm is about
    A. 20   B. 200   C. 2000
16. The length of a new lead pencil is about:
    A. 1 decimetre   B. 2 decimetre   C. 3 decimetre
17. Give situations in daily life that require measurement of length.

18. **Addition and subtraction of length in metres and centimetres and multiplication of length in metres and centimetres by a number**

Many situations require addition of length e.g. when we want to know how much electric wire to buy for connecting two different appliances to an electric connection. Other situations require subtraction of length e.g. when a shopkeeper who had a roll of water pipe 50 m long, sold 15 m and wants to know how much of that is left over.

Some other situation require multiplication of length by a number e.g. if one wants to know how much ribbon to buy for making four ribbons of a specified length.

We can add and subtract lengths like numbers if these have the same units m or cm, but their sum or difference is in m or cm. Similarly, we can multiply m or cm by a number just like numbers, but the product is in m or cm.

If a measure involves m and cm, then we add cm to cm and m to m. Similarly, we multiply m and cm separately by the number. If after addition or multiplication the number of cm is more than 100, we convert 100 cm to 1 m, 200 cm to 2 m, 300 cm to 3 m and so on and add that to m in the sum or product.

Similarly, we subtract cm from cm and, m from m. If in subtraction the number of cm to be subtracted is more, then we rename 1 m as 100 cm and add that to cm and reduce the number of m by 1.

Example 1

Add

345 m	25 cm	10 m 50 cm
+278 m	+50 cm	+ 8 m
----------	----------	---------------------
623 m	75 cm	18 m and 50 cm
----------	-----------	---------------------

Example 2

Add

  5 m 50 cm
+2 m 80 cm
----
  7 m 130 cm
=7 m + 1 metre 30 cm
=8 m and 30 cm

Example 3

Subtract

385 m	80 cm	10 m and 80 cm
–239 m	–50 cm	– 6 m and 25 cm
--------------	------------------	------------------------------------.
146 m	30 cm	4 m and 55 cm
--------------	------------------	------------------------------------

Example 4

Find 6 m 50 cm – 2 m 80 cm

Since we cannot subtract 80 cm from 50 cm, we rename a metre as 100 cm and add to 50 cm. Thus, 6 m and 50 cm can be written as 5 m and 150 cm and now we can subtract m from m and cm from cm.

  5 m 150 cm
–2 m 80 cm
----
  3 m 70 cm

Example 5

A lady bought 2 m and 75 cm of cloth for her shirt and 2 m and 25 cm of cloth for her salwar. How much cloth did she buy in all?

Cloth bought for the shirt	2 m 75 cm
Cloth bought for the salwar	+2 m 25 cm

Total cloth bought	4 m 100 cm = 5 m.

Example 6

A man bought 10 m of rope. He used 2 m 25 cm for tying a box. How much rope does he have now?

(10 m – 2 m and 25 cm)

Since we cannot subtract 25 cm from 0 cm, we rename a metre as 100 cm. Thus, we can write 10 m as 9 m and 100 cm.

Total rope bought	9 m 100 cm
Rope used up	–2 m 25 cm

Left over rope	7 m 75 cm

Example 7

Aruna bought 4 ribbons each of them 75 cm long. How much ribbon did she buy in all?

Length of 1 ribbon	75 cm
Length of 4 ribbons	$\times$ 4

Total length of ribbon bought by Aruna	300 cm = 3 m

Exercise 8.2

1. Find
   (a) 576 m 25 cm +359 m 55 cm
   (b) 3 m and 25 cm + 1 m and 75 cm
   (c) 23 m and 30 cm +18 m and 85 cm
   (d) 248 m and 50 cm + 53 m and 70 cm
2. Find
   (a) 785 m 90 cm – 259 m and 46 cm
   (b) 8 m and 80 cm – 6 m and 25 cm
   (c) 6 m and 50 cm – 2 m and 80 cm
   (d) 14 m and 30 cm – 5 m and 50 cm
   (e) 463 m and 50 cm – 278 m and 70 cm
3. A man bought 25 m long water pipe. He used 2 m of that for connecting a washing machine to a tap. How much of the pipe is left with him?
4. A shopkeeper bought 125 m, 258 m and 362 m of different types of cloth on a particular day. How much cloth did he buy in all?
5. A floor is covered with 50 cm square tiles. If there are 8 tiles along the length of the room. How long is the room?
6. Sunita cut a ribbon into 4 equal pieces. If each of these was 75 cm long, how much ribbon did she have?

UNIT 9

Weight

You would have seen a vegetable vendor or a grocer weighing things with a balance and a set of blocks. He puts the block e.g. 1 kg on one side and the things on the other side. He goes on adding or removing things until the balance does not tilt to either side to weigh 1 kg.

Kilogram is the standard units for weight, and is written in short as kg. Some commonly used blocks for measuring weight are given below:
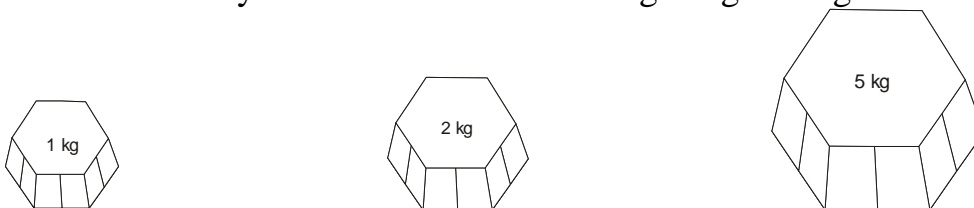
We measure the weight of lighter objects by using a smaller measure called **gram** that is written in short as g. A kg is equal to 1000 g.
Some commonly used blocks for small measures of weight are given below:

50-gram   100-gram   200-gram   500-gram

If an objects needs to be balanced by using both kg and g say 2 kg and 500 gm, then its measure may be written as 2 kg 500 g or 2 kg 500 g.
One or more of these weights may be used to weigh different amounts of things.
We need two 500 g weights to balance 1000 g or 1 kg?

Alternatively, 500 g is $\frac{1}{2}$ of 1000 g or 1 kg.

We need four 50 g weights to balance 200 g.

Alternatively, 50 g is $\frac{1}{4}$ of 200 g.

You can verify these using a balance.
Such relations are useful in shopping. For example, if the cost of one kg of almonds is Rs 400, the cost of 250 g would be one-fourth of Rs.400 that can be found by dividing 400 by 4. As $400 \div 4 = 100$, the cost of 250 g of almonds would be Rs 100.

Exercise 9.1

1. What are the units for measuring weight?
2. How many g are there in one kg?
3. If you have 50 g, 100 g, 200 g, 500 g, 1 kg, 2 kg and 5 kg blocks of weights. What combination of weights you would use to weigh the following amounts of things.:
   (a) 500 g   (b) 150 g   (c) 1 kg 500 g
   (d) 250 g   (e) 600 g   (f) 3 kg 750 g
4. If you have only the following blocks of weights, how will you weigh the following amounts:
   (a) 4 kg given only 5 kg and 1 kg blocks
   (b) 800 g given only 1 kg and 200 g blocks
   (c) 500 g given only 1 kg block
5. What units kg or gram would you use to weigh the following objects:
   (a) a gold bangle   (b) a sack of rice   (c) a spice
   (d) a sack of wheat   (e) a steel bucket   (f) a medicine
6. Fill in the blanks with appropriate fractions:
   (a) 500 g = _____ one kg
   (b) 250 g = _____ one kg
   (c) 750 g= _____ one kg
7. If the cost of a pulse (dal) is Rs 16 per kg, what will be the cost of the following amounts of pulse:
   (a) 500 g
   (b) 2 kg
   (c) 250 g
8. If the cost of a 5 kg of rice is Rs 100, what will be the cost of the following amounts of rice:
   (a) 1 kg
   (b) 2 kg
   (c) 500 g
   (d) 250 g
9. Round off the following to the nearest 100 gram
   (a) 420 g
   (b) 580 g
   (c) 1 kg 780 g
   (d) 3 kg
10. Weigh the following objects
    (a) your math book
    (b) your math notebook

(c) a brick

(d) a water melon

Were you able to find its exact weight with the standard weights (If you had e.g. 1 kg, 500 gm, 250 gm, 100 gm and 50 gm only) If not how did you find its approximate weight?

11. Group project

Estimate the number of beans (rajmaa, channa) in a jar and report to the class how you estimated it.

Addition and subtraction of weight

Many situations require addition of weight e.g. when we buy a number of vegetables with different weights and want to know how much weight we would have to carry?

Other situations require subtraction of weight e.g. when a shopkeeper who had a number of kg of a food item and sold some of it and wants to know how much is left over to decide how much more to buy this week.

You can add and subtract weight like numbers if they both have the same units-g or kg. For example

```
  5 kg                  500 g                 4 0 0 g
+4 kg                  +250 g                - 2 5 0 g
---------------        --------------        ---------------
  9 kg                  750 g                 1 5 0 g
---------------        -------------         ---------------
```

If measures of weight of one or both objects are a certain number of kg and certain number of g, then add g to g and kg to kg. If the number of g in sum or product is equal to or more than 1000, we convert that to the highest multiple of 1000 g + g, convert the multiple of 1000 to that many kg and add the kg to the sum or product in kg. For example, we write 1700 g = (1000 + 700) g = 1 kg and 700 g, 1050 g as (1000 + 50) = 1 kg 50 g, 1007 g = (1000 + 7) g = 1kg 7g.

Example1
```
  2 kg 500 g
+1 kg 200 g
---------------
  3 kg 700 g
---------------
```

Example2
```
  5 kg 750 g
+3 kg 500 g
-----------------------------------------
  8 kg 1250 g
  8 kg + 1 kg + 250 g
  9 kg 250 g
-----------------------------------------------
```

Similarly, we subtract g from g and kg from kg. If the no of g to be subtracted is more then we take away 1 kg from kg, rename it as 1000 g, and

add that to g and then subtract the g from g.

Example 3

```
  4 kg 500 g
- 2 kg 250 g
----------------
  2 kg 250 g
```

Example 4

Find 4 kg 500 g -2 kg 750 g

As the number of g to be subtracted 750 is more than 500, we write 4 kg 500 g as 3 kg + 1000 g + 500 g = 3 kg 1500 g. Subtracting g from g we have 1500 – 750 =750 and kg from kg we have 3 – 2 = 1 which we can write in vertical form as

```
  3 kg 1500 g
 -2 kg 750 g
-----------------
  1 kg 750 g
-----------------
```

Rounding off **to the nearest kilogram**

If the number of kilograms is large, we may not want to bother with grams. We then round off to the nearest kilogram. If the number of grams is less than 500, we ignore the grams. If the number of grams is 500 or more than 500, we round off the kilograms to one more kilogram. For example, we would round off 350 kg 400 g to 350 kg, 720 kg 700 g to 721 kg and 575 kg 500 g to 576 kg.

Exercise 9.2

1. What are the units for measuring weight?
2. How many g are there in one kg?
4. Add the following:
   (a) 500 g + 250 g   (b) 250 g + 200 g
   (c) 378 kg + 265 kg + 132 kg   (d)2 kg 400 g + 3 kg 350 g
   (e) 2 kg 500 g + 3 kg 700 g   (f) 2 kg 500 g +5 kg 650 g
5. Subtract the following:
   (a) 576 g - 342 g   (b) 632 kg - 182 kg
   (c) 6 kg 500 g - 3 kg 250 g   (d) 25 kg 800 g - 8 kg 500 g
   (e) 348 kg 200 - 200 kg 350 g   (f) 500 kg 100 g - 253 kg 250 g
6. A man bought 2 kg onions, 1 kg potatoes and 1 kg tomatoes. How many kg of vegetables did he buy?
7. A lady bought 550 g of apples and 250 g of grapes. How much fruit did she buy?
8. A shopkeeper had 357 kg of sugar at the beginning of a month. He sold 238 kg 500 gram of sugar during the month. How much sugar does he have now?
9. A truck is carrying 500 kg of wheat, 385 kg of rice and 150 kg of pulses. How much food grains did the truck carry?
10.Make up stories that require the following calculations:
   (a) 3 kg + 2 kg
   (b) 500 g – 200 g

UNIT 10

Volume

The amount of liquid in a container is called its **volume**.
Again, we need standard units so that everyone's measures of volume would be the same.
The standard unit for measuring volume is a **litre**, written in short form as *l*
The maximum amount a container can hold is called its **capacity**.
Show containers that have a capacity of one litre.
We measure volume of smaller amounts in **millilitres,** written in short form as *ml*.
One litre is the same as 1000 millilitres.
Show some standard containers that have smaller capacity such as milk bottles, coke and medicine bottles.
We may need to find other amounts of liquids e.g. milk for a recipe. We can measure other amounts by a measuring cup that has millilitres marked on it.
Show a measuring cup and how to use it to measure capacity of different containers or measure different amounts of liquid by it.
Some commonly used containers with different capacities in litres and millilitres are given below:

| 1 litres | 2 litres | 5 litres |

Ask students to find some containers at home that specify the amount they can hold e.g. milk bottles, cola bottles, medicine bottles, measuring cup etc. and bring them. Show these to the class to give an idea of different amounts.

Pictures of containers that contain different amount of liquids and a measuring cup are given below:

| 100 *ml* | 200 *ml* | 500 *ml* | 250 *ml* |
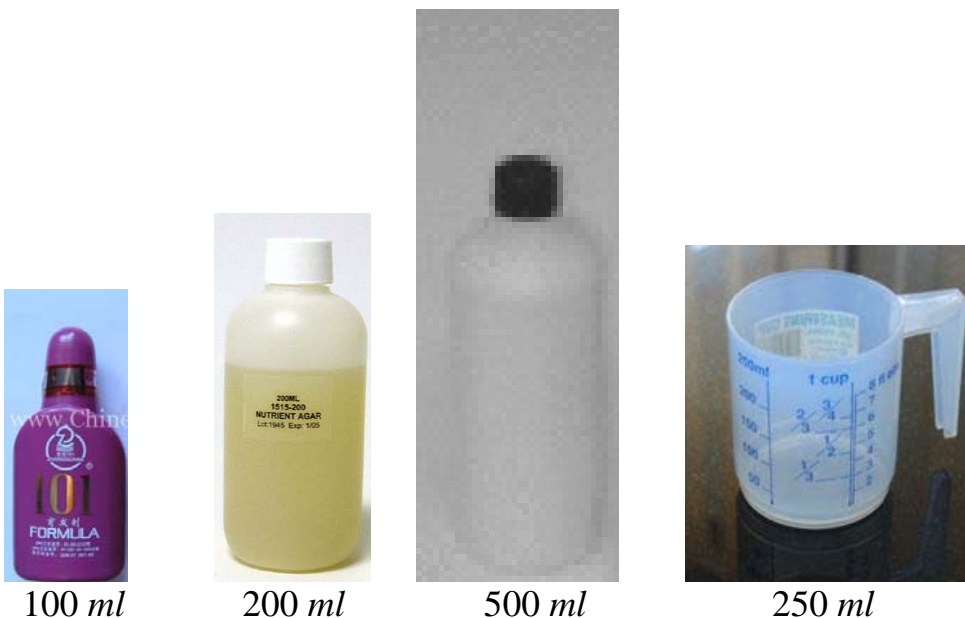
We need to measure two 500 ml containers to measure 1000 ml.

Alternatively, 500 *ml* is $\frac{1}{2}$ of 1000 *ml* or 1*l*.

We need four 250 *ml* cups to measure 1000 *ml*.

Alternatively, 250 *ml* is $\frac{1}{4}$ of 1000 *ml* or 1 *l*

We need two 100 *ml* cups to measure 200 *ml*.

Alternatively, 100 *ml* is $\frac{1}{2}$ of 200 *ml*.

You can verify these using appropriate containers.

Such relations are useful in shopping. For example, if the cost of one litre of milk is Rs 18, the cost of half a litre of milk would be one-half of Rs 18 that is Rs 9.

Rounding off to the nearest litre

If the number of litres is large, we may not want to bother with millilitres. We then round off to the nearest litre. If the number of millilitres is less than 500, we ignore the millilitres. If the number of millilitres is 500 or more than 500, we round off the litres to one more litres. For example, we would round off 350 litres 400 millilitres to 350 litres, 720 litres 700 millilitres to 721 litres and 575 litres 500 millilitres to 576 litres.

Exercise 10.1

1. Measure larger amount of liquid using standard containers of lower capacity.
2. How would you compare the capacity of two containers?
3. What are the units for measuring capacity?
4. Name some things that you buy in litres.
5. Name some things that you buy in millilitres.
6. Bring small containers of coke bottles, medicine bottles and measure the capacity of some other containers using those.
7. Estimate the capacity of given containers and check by using standard containers of smaller capacity.
8. Give examples of situations that require measurement of capacity.
9. How many milliltres are there in one litre?
10. If milk is available in 500 millilitres pouches and you want to buy 1 litre of milk. How many pouches of milk you should buy?
11. Give combination of measures of 50 *ml*, 100 *ml*, 200 *ml*, 500 *ml*, 1*l*, 2 *l*, 5 *l* to measure the following amounts of liquids:
    (a) 500 *ml*   (b) 150 *ml*   (c) 1 *l* 500 *ml*
    (d) 250 *ml*   (e) 400 *ml*   (f) 3 *l* 750 *ml*
12. How will you measure the following amounts of water given only the specified containers:
    (a) 4 litres given only 3 litre and 1 litre containers
    (b) 3 litres given only 2 litre and 5 litre containers
    (c) 400 ml given only 100 ml containers
    (d) 5 litres given only 2 litre and 1 litre containers
13. Fill in the blanks with appropriate fractions:
    (a) 500 *ml* = ____ one *l*
    (b) 250 *ml* = ____ one *l*
14. If the cost of a milk is Rs 16 per litre, what will be the cost of the following amounts of milk:
    (a) 500 *ml*
    (b) 2 *l*
    (c) 250 *ml*
15. If the cost of a one litre of kerosene oil is Rs 32, what will be the cost of the following amounts of kerosene oil:
    (a) 2 *l*
    (b) 250 *ml*
    (c) 500 *ml*

16. Round off the following to the nearest litre:
    (a) 487 litres and 700 millilitres→_____ litres
    (b) 289 litres and 250 millilitres→_____ litres
    (c) 897 litres and 500 millilitres→_____ litres

Addition and subtraction of litres and milliltres

Many situations require addition of litres or millilitres e.g. when a dairy collects milk from many vendors and wants to know if it has enough for its daily sale. Other situations require subtraction of litres or millilitres e.g. when a shopkeeper who had a number of litres of milk and sold some of it and wants to know how much is left over to decide whether he has enough to meet a customer's demand.

Litres can be added to litres, subtracted from litres or multiplied by a number just like numbers, but the sum, difference or product is in litres. Similarly, millilitres can be added to millilitres, subtracted from milliliters.

If the measurement involves both litres and millilitres, then we add millilitres to millilitres and litres to litres. If the number of millilitres in the sum is equal to or more than 1000, we convert the highest multiple of 1000 millilitres + millilitres, convert the multiple of 1000 to that many litres and add the litres to the sum or product in litres. For example, we write 1700 millilitres = (1000 + 700) millilitres = 1 litres and 700 millilitres, 1050 millilitres as (1000 + 50) = 1 litres 50 millilitres, 2750 millilitres = (2000 + 750) = 2 litres 750 millilitres

Example1

    3 *l* 500 *ml*
+2 *l* 300 *ml*
----
    5 *l* 800 *ml*

Example2

    4 *l* 700 *ml*
+3 *l* 500 *ml*
----
    7 l 1200 *ml*
=8 *l* + 1 *l* + 200 *ml*
=9 *l* 200 *ml*

Similarly, we subtract *ml* from *ml* and *l* from *l*. If the no of *ml* to be subtracted is more then we take away *1* litre from *l*, rename it as 1000 *ml*, and add that to *ml* and then subtract the *ml* from *ml*.

Example 3

    4 *l* 500 *ml*
- 1 *l* 200 *ml*
----
    3 *l* 300 *ml*

Example 4

  4 *l* 400 *ml*

 -2 *l* 750 *ml*

As the number of ml to be subtracted 750 is more than 400, we write 4 *l* 700 *ml* as 3 *l* + (1000 + 400 = 1400) *ml*. Subtracting *ml* from *ml* we have 1400 – 750 = 650 and *l* from *l* we have 3 – 2 = *l* which we write below the line

  3 *l* 1400 *ml*

 -2 *l*   750 *ml*

----

  1 *l*   650 *ml*

Example 5

A ration depot had 400 *l* of kerosene oil, it sold off 135 *l* on a particular day. How much kerosene oil does it have now?

  400 *l*

–135 *l*

-------------.

  265 *l*

Example 6

A sweetshop owner bought 15 *l* and 500 *ml* of milk. He used up 8 *l* and 800 *ml* of milk for making a sweet. How much milk is left with him?

  15 *l* 500 *ml* = 14 *l* 1500 *ml*– 8 *l* 800 *ml* =6 *l* 700 *ml*

Exercise 10.2

1. Convert the following to *l*
   1000 *ml* = _____*l*
   5000 *ml* = _____*l*
   1500 *ml* = _____*l* _____*ml*
   4050 *ml* = _____*l* _____*ml*
2. Convert the following to ml:
   1 *l* = _____*ml*
   2 *l* =_____*ml*
   5 *l* = _____*ml*
   1 *l* and 500 *ml* = _____*ml*
   3 *l* and 200 *ml* = _____*ml*
3. Round off the following to the nearest litre:
   487 *l* and 700 *ml*→_____ *l*
   289 *l* and 250 *ml*→_____ *l*
   897 *l* and 500 *ml*→_____ *l*
4. Add the following:
   (a) 855 *l* + 377 *l*   (b) 288 *l* 500*ml* + 475 *l* 700 *ml*
5. Subtract the following:
   (a) 890 *l*–377 *l*   (b) 700 *l* 200 *ml*–285 *l* and 450 *ml*
6. How can you measure the following amount of milk if you have standard containers of 1 litre and 2 litre capacities?
   (a) 3 *l*
   (b) 5 *l*
7. Two buckets have a capacity of 16 *l* 500 *ml* and 14 *l* 500 *ml*. How much water can be stored in those?
8. A lady bought 2 *l* and 500 *ml* of milk. If she used up 1 *l* and 200 *ml* of milk for breakfast. How much milk is left with her?
9. A petrol pump had 800 *l* of petrol. Another petrol pump had 432 *l* of petrol. How much more petrol does the first petrol pump have compared to the second?
10. A dairy bought 23 *l* from one milk vendor, 17 *l* from another milk vendor. How much milk did it buy in all?
    After it sold off 15 *l*, how much milk is left with it?

UNIT 11

Time

Review of time
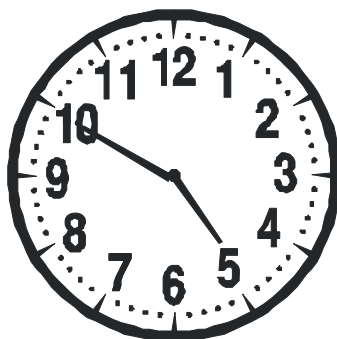
1. Show the hour hand and minute hand in the clock.
2. Show the direction in which the hands move by drawing an arrow.
3. What is the direction in which the hands move called?
4. What is the direction opposite to which hands of a clock move called?
5. What time does the clock show?

We read time by looking at the minute hand and hour hand.
- If the minute hand points to 12 and the hour hand points to a number say 5, the time is 5 O' clock.
- If the minute hand points to a number other than 12, the hour hand is between two numbers and the time is 5 times the number the minute hand points to past the hour, the hour-hand has passed. In the clock given below the minute hand is on 3 and the hour hand is past 9. Therefore, the time is $3 \times 5 = 15$ minutes past 9. We can also express the time in terms of minutes it will take for the hour hand to go to 10.As it will take 45 minutes for the hour hand to go to 10; we can express it as 45 minutes to 10. We usually do that if the time is less than 30 minutes. As there are 60 minutes in an hour, 15 minutes is one-fourth or quarter of that, we can also express 9:15 as quarter past 9. Similarly when the time is 9:45 it will take 15 minutes to go to 10, we can also express 9:45 as quarter to 10. Note that 30 minutes past three is the same as half past three or 3:30
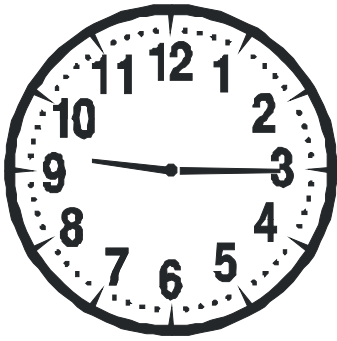
9:15 or quarter past 9

Verify the time on other clocks is as given below them.
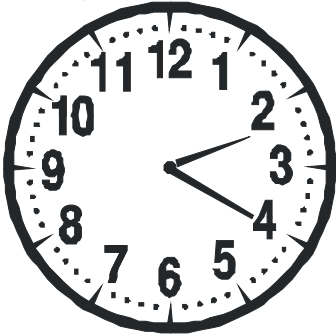
2:20 or 20 minutes past 2
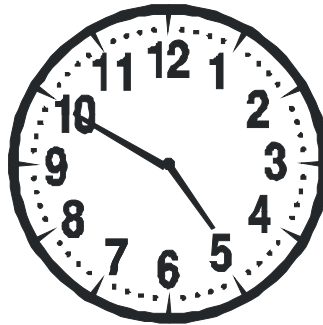
50 minutes past four or 4:50
or 10 minutes to 5

- If the minute hand points to a dot between two numerals, then multiply the numeral minute hand has passed by 5 and add to it the number of dots after the numeral to which minute hand points to. Note that the minute hand takes one minute to move from one dot to the next dot. Verify the time on the clocks given below:
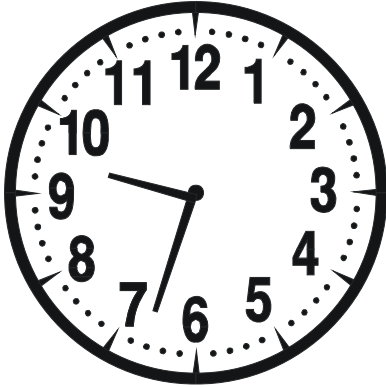
| 33 minutes past nine or 9.33 or 27 minutes to 10 | 47 minutes past eleven or 11.47 or 13 minutes to 12 |
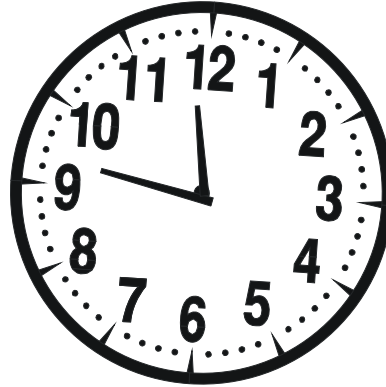
Setting a clock

We often need to set a clock to a specific time as your clock might have stopped or become slow due to a weak battery. We set it by first moving the hour hand and then the minute hand to the specified minutes.
Suppose we want to set it to 7:40, move or set the hour hand to 7 and then move the minute hand to 8.
Similarly to set it to 4:34, move or set the hour hand to 4, and then move the minute hand to 4 dots past 6 which show 34 minutes.

Exercise 11.1

1. Read the time shown on the clocks given below:
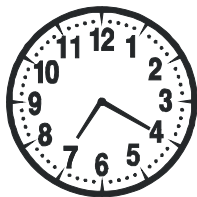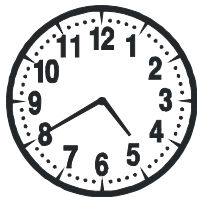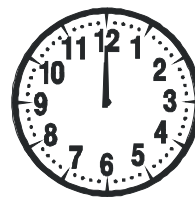
(a)   (b)   (c)
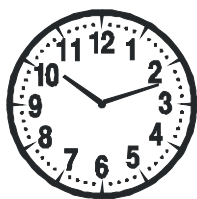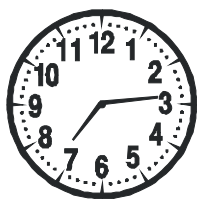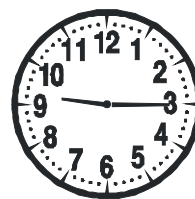
(d)   (e)   (f)

2. Write the following times in as many ways as you can:
   (a) 4:10   (b) 5:30   (c) 8:45   (d) 9:15
3. If you want to set the times given below, tell where would you set (i) the hour hand and (ii) the minute hand:
   (a) 4O'clock   (b) 5:30   (c) 8:45   (d) 4:32
4. Set the following times on a clock at home and have someone check it.
   (a) 7O'clock   (b) 5:30   (c) 8:45   (d) 4:32
   (e) 5:15   (f) 7:13   (g) 12 o'clock
5. What would be the time half an hour after the times given below:
   (a) 4 o'clock   (b) 6:30   (c) 3:15   (d) 10:43
6. What would be the time 15 minutes before the times given below:
   (a) 10 o'clock   (b) 2:30   (c) 9:45   (d) 6:52

Use of a.m. (ante meridian) or p.m. (post meridian)
The clock shows the same time twice during a day. We write a.m. or p.m. after the time. The time from 12 mid-night to 12 noon is noted as a.m. and the time from 12 noon to 12 mid night as p.m.
We do not attach a.m. or p.m. to 12 o'clock at noon or 12 o'clock at mid night.
Duration of time
We often need to find duration of an event starting and finishing at particular times. We can think of these times on a clock and count the hours and minutes the clock would have taken to move from one time to the other.
If the hour of start and finish of the event is the same, we count the minutes by subtraction.
If the hour of start and finish of the event is different, then we can find the minutes to the next hour, then find the hours from that to the hour of the time event finishes and then the minutes past that and add all of them. If the minutes are more than 60, we convert those to hours and minutes.
Example 1
The first period begins at 7:10 a.m. and ends at 7:50 a.m. how long the duration of the period is?
It will take the clock 40 minutes to move from 7:10 a.m. to 7:50 a.m., the duration of the period is 40 minutes.
Example 2
A movie starts at 12.30 p.m. and ends at 3:15 p. m., what was the duration of the movie?
Time from 12:30 p.m. to 1:00 p.m. = 30 minutes
Time from 1:00 p.m. to 3:00 p.m. = 2 hours
Time from 3:00 p.m. to 3:15 p.m. = 15 minutes
Total duration of the movie = 2 hours 45 minutes.
Example 3
A train starts at 2.15 p.m. from Delhi and reaches Ambala at 5:30 p.m., how long does it take to perform the journey?
Time from 2:15 p.m. to 3:00 p.m. = 45 minutes
Time from 3:00 p.m. to 5:00 p.m. = 2 hours
Time from5:00 p.m. to 5:30 p.m. = 30 minutes
Total duration of the movie = 2 hours 75 minutes
= 2 hours + 1 hour 15 minutes
= 3 hours 15 minutes.
Sometimes we know the starting time and the duration of the event and want the finishing time of the event. Then we add the hours and minutes to the time event started to find out at what time the event would finish.

Example 4

The journey from Delhi to Saharanpur takes 4 hours and 30 minutes, at what time the train that started from Delhi at 3:40 p.m. will reache Saharanpur?

4 hours after 3:40 p.m. is 7:40 p.m.

30 minutes after 7:40 p.m. is 8:10 p.m.

Therefore, the train would reach Saharanpur at 8:10 p.m.

Duration in days

Some events last for days or days and months, a calendar is helpful in finding the intervals between specified days.

A calendar is given on next page.

A day is specified by a day and month during a year.

If month is the same, we find the duration of the event by counting the days of the event from calendar.

Example 1

Dushera holidays start on 5th October and end on 16th October. How long are Dushera holidays? We can either count up to 16 beginning with 5, or find the days in October that are not holidays and subtract them from 16.

Days before October 16 that are not holidays – 4

Length of Dushera holidays = 16 – 4 = 12 days.

If month of start and finish is different, we find the duration of the event by finding days in the month of the event as explained above to days in next months and the days in the month the event finished.

Example 2

Gaurav went on leave on 16th May and came back to work on 3rd July, How long was his leave?

Number of days in May he was not on leave = 15 days

Number of days he was on leave in May = 31 – 15 =16 days

Number of days he was on leave in June = 30 days

Number of days he was on leave in July = 2 days

Total number of days he was on leave = 16 + 30 + 2 = 48 days.

Example 3

A mela was to be held for 10 days, if it started on December 5, what would be its last day?

Counting 10 days beginning with 5, we get to 14 December. Therefore, the last day of Mela would be 14 December.

Calendar for year 2008

January

Su	Mo	Tu	We	Th	Fr	Sa
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

8:● 16:◑ 22:○ 30:◐

February

Su	Mo	Tu	We	Th	Fr	Sa
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	

7:● 14:◑ 21:○ 29:◐

March

Su	Mo	Tu	We	Th	Fr	Sa
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

7:● 14:◑ 22:○ 30:◐

April

Su	Mo	Tu	We	Th	Fr	Sa
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

6:● 13:◑ 20:○ 28:◐

May

Su	Mo	Tu	We	Th	Fr	Sa
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

5:● 12:◑ 20:○ 28:◐

June

Su	Mo	Tu	We	Th	Fr	Sa
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

4:● 10:◑ 18:○ 26:◐

July

Su	Mo	Tu	We	Th	Fr	Sa
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

3:● 10:◑ 18:○ 26:◐

August

Su	Mo	Tu	We	Th	Fr	Sa
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

1:● 9:◑ 17:○ 24:◐ 31:●

September

Su	Mo	Tu	We	Th	Fr	Sa
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

7:◑ 15:○ 22:◐ 29:●

October

Su	Mo	Tu	We	Th	Fr	Sa
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

7:◑ 15:○ 21:◐ 29:●

November

Su	Mo	Tu	We	Th	Fr	Sa
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

6:◑ 13:○ 20:◐ 27:●

December

Su	Mo	Tu	We	Th	Fr	Sa
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

6:◑ 12:○ 19:◐ 27:●

Holidays and Observances:

126

Jan 15	Pongal	Jul 7	Rath Yatra
Jan 19	Muharram	Aug 15	Independence Day
Jan 26	Republic Day	Aug 19	Janmashtami
Feb 11	Vasant Panchami	Sep 3	Ganesh Chaturthi/Vinayaka Chaturthi
Mar 5	Maha Shivaratri/Shivaratri	Oct 2	Mathatma Gandhi Jayanti
Mar 20	Prophet's Birthday	Oct 3	Ramzan Id/Eid-ul-Fitar
Mar 21	Good Friday	Oct 9	Dussehra/Dasara
Mar 22	Holi	Oct 27	Diwali/Deepavali
Apr 14	Ram Navami	Nov 13	Guru Nanak Jayanti
Apr 18	Mahavir Jayanti/Id-E-Milad	Dec 9	Bakri Id/Eid ul-Adha
May 20	Buddha Purnima/Vesak	Dec 25	Christmas

Exercise 11.2

1. What would be appropriate a.m. or p.m. for the following times:
   (a) I get up at 6:00
   (b) I go to school at 7:15
   (c) I have my lunch at 1:10
   (d) Our school closes at 12:30
2. What would you use-a.m. or p.m. to write the following times:
   (a) 7 in the morning
   (b) 4 in the evening
   (c) 9 at night
   (d) 10 in the morning
3. A shop opens at 10:00 a.m. and closes at 7:30 p.m. For how many hours is the shop open?
4. What would be the time 40 minutes after the following times:
   (a) 5:00 a.m.
   (b) 4:40 p.m.
   (c) 9:15 p.m.
   (d) 12 o'clock at noon
5. A TV programme begins at 4:05 and ends at 4:32, what is the duration of the programme
6. A Tennis match began at 9:15 a.m. and ended at 10:36, what is the duration of the match.
7. A play is 2 hours 15 minutes long, if it began at 6:00 p.m., at what time it would end.
8. Give examples of situations where you need to find intervals in hours and minutes.
9. How many days are there in a week? Name the days of the week in order.
10. How many months are there in a year? Name the months of a year in order.
11. How many days are there in the following months?
    (a) January
    (b) May
    (c) June
12. Read the following dates:
    (a) 3.9.02   (b) 4.1. 99   (c) 4 July, 2005
11. Write the date today in two ways.
12. Which day of the month is the second Saturday of January?

13. Our independence day is on 15 August, find the day of the week on which it would fall this year from the calendar in the class.
14. When is your birthday? Find the day of the week on which it would fall this year.
15. Where do you find dates written in your surroundings?
16. Ravindra worked from December 4 to December 11 in an Exhibition, how many days did he work?
17. Anita stayed from May 17 to June 10 in Bombay, how many days did she stay in Bombay?
18. The schools close for Christmas vacation for 10 days. If the vacations started on December 24, when will the schools reopen?
19. Give examples of situations where you need to find duration in days.

UNIT 12

Collection Organization, Display and Interpretation of data

Collection and tallying of real-world data
Ask students about health foods
Then select one health food depending on the season and write on the black board,
I like cauliflower
I do not like cauliflower
Then ask students, one at a time, to describe how they feel about eating that food e.g. cauliflower, and mark a tally in the correct row.
When all the students have given their opinion, call on a volunteer to count the number of tallies in each row and record the number at the end of the row. It would make the counting easier if we record the fifth entry by making a diagonal mark across the first four lines (卌). Call on a volunteer to redraw the tallies using the grouping notation and then ask
1. Did it make easier to count the tallies in the tally graph?
2. Why did that notation make it easier?
3. Can you name the categories for which we collected data for the chart?
4. How did we show what we found out?

Pictographs
A pictograph is a graph that uses pictures to give information**.**
The pictograph given below shows children in a class born in different months (or the teacher can make the chart for the class by listing the months and asking children to come one by one and draw a smiley face against the month in which they were born):

January	☺ ☺ ☺
February	☺ ☺ ☺ ☺ ☺ ☺
March	☺ ☺ ☺ ☺ ☺
April	☺ ☺ ☺
May	☺ ☺
June	☺ ☺ ☺ ☺
July	☺ ☺ ☺ ☺
August	☺
September	☺ ☺ ☺
October	☺ ☺ ☺ ☺
November	☺ ☺
December	☺ ☺

We can find the following information from this chart:
- Number of children born in different months by counting the numbers of smiley faces against that month, e.g. 3 children were born in January, 4 children were born in October?
- The month with largest numbers of smiley faces is the month in which maximum number of children were born.
- The month with smallest number of smiley faces is the month in which minimum number of children were born.
- The total of smiley faces in all the rows gives the number of children in the class.

The pictograph given below shows the snacks students like the most of the four snacks listed for a class of students.

Snacks we like

Samosa	☺ ☺ ☺ ☺ ☺ ☺ ☺ ☺ ☺ ☺ ☺ ☺ ☺ ☺
Potato Chops	☺ ☺ ☺ ☺ ☺ ☺
Bread Pakora	☺ ☺ ☺ ☺ ☺ ☺ ☺ ☺ ☺ ☺ ☺ ☺
Cake	☺ ☺ ☺ ☺ ☺ ☺ ☺ ☺

☺ = 1 students

Ask students,
- How many children like Samosa the most?
- How many children like cake the most?
- Which row had the most pictures? What does that mean?
- Which row had the fewest pictures? What does that mean?

In the above pictograph, each face represented one student.
If the number of objects is large, a face can be used to represent 2 or more objects.
We write it at the bottom of the pictograph.
If eight children chose a snack, we show it by half of that, which is 4 smiley faces.
How would you show that eleven people chose that snack?
The chart given below presents the same information with a face here representing two objects.

Snacks we like the most

Samosas	☺ ☺ ☺ ☺ ☺ ☺ ☺
Potato chops	☺ ☺ ☺
Bread Pakora	☺ ☺ ☺ ☺ ☺ ☺

Cake	☺ ☺ ☺ ☺

☺ = 2 students

We can find the information from this chart in a similar manner, we only have to multiply the information that requires counting by multiplying the count by the number each face presents 2 in this case, e.g.

- Number of children who like a snack the most by counting the number of smiley faces against that snack and multiplying it by the number each face presents 2 in this case, that is $7 \times 2 = 14$.
- The snack with largest numbers of smiley faces is the snack which is most popular.
- The snack with smallest numbers of smiley faces is the snack which is least popular.
- The number of children in the class can be found by multiplying the total number of smiley faces in all the rows by the number each face presents 2 in this case, that is $20 \times 2 = 40$.

Exercise 12.1

1. A child collected the leaves given in Activity Sheet 1 that had fallen on a day in his garden. Cut these and make a pictograph of leaves with different shapes. You can label them as leaves of shape 1, shape 2, and so on.
   Is it easier now to see
   (a) How many leaves of different shapes are there?
   (b) What shape is most frequent?
   (c) What shape is least frequent?
   (d) If the number of leaves of one shape is more or less than leaves of another shape.
   (e) The total number of leaves collected.

2. The number of different vehicles passing a pole in a busy street at a point in 5 minutes is shown in the pictograph given below:

Cars	
Buses	
Autorickshas	
Motor cycles	
Bicycles	

A picture stands for 5 vehicles

(a) How many auto rickshaws passed the point?
(b) How many buses passed the point?
(c) Among the vehicles passing the point, which vehicle is most common?
(d) Among the vehicles passing the point, which vehicle is least common?
(e) What are the advantages of representing many vehicles by a vehicle in the pictograph?
(f) What are the disadvantages of representing many vehicles by a vehicle in the pictograph?

3. The students of a class collected data on their favourite hobby and found the following:

Hobby	Singing	Watching TV	Playing	Reading	Others
Number of students	8	10	6	4	6

(a) Use table 1 in Activity Sheet 12.2 to make a pictograph of the above data where a smiley face represents 1 child by labeling rows using as many rows in the table 1 as necessary and drawing smiley faces.

(b) Make a pictograph of the above data using the second table in Activity Sheet 12.2 where a smiley face represents 2 children

UNIT 13

Geometry

Circle

We find many things in our environment that have a circular shape e.g. face of some clocks, some plates, five-rupee coin, a CD. We can draw a circle with the help of these by drawing around these.
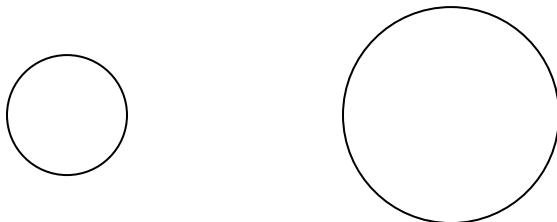
Activity 13.1

We can also draw it by the help of a pencil and string.
Pivot a string with a drawing pin and make a loop to hold a pencil at the other end. Holding the string taught move it around. The figure drawn is a circle. Remove the pin and mark a point there. This point marks the **centre** of the circle.
Join the centre with different points on the circle. Measure the length of the line segments.
What do you notice about the length of line segments? (They are all equal.) The length of the line segment joining the centre to any point on the circle is called the **radius**.
Extend a line segment joining a point on the circle with the centre until it meets the circle again. Measure its length. What do you notice about its length? (It is equal two times the radius). It is called the **diameter**.
The distance around the circle is called the **circumference**. We can measure it by a thin string or wool by marking a point P on the circle and starting measuring from there holding the string along the circle until we come back to P. The measure of the length of the string is the circumference.

Activity 13.2

Draw a circle, cut and fold it so that the two parts cover each other exactly. Fold it again and open it. The point O where the two folds meet is the centre of the circle. The folds AB and CD are the diameters. We can find the radius of the circle by joining any point P on the circle with the centre O.
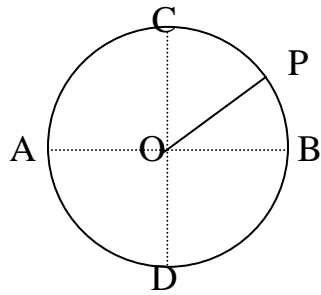
Can you think of any reason we may need to know the circumference, diameter, and/or the radius of a circle. (We may need to know the diameter of a clock to see if it will fit in a spot on the wall, the circumference of a candle to see if it can fit in a candleholder, the diameter of a round table to be able to find a tablecloth that will fit the table.)

Exercise 13.1

1. Give examples of models of circles in the environment.
2. Students of a class gave the following examples of models of a circle.
   (a) a ball   (b) five rupee coin   (c) a laddu
   (d) a CD   (e) face of some clocks   (f) globe
   Which of these are correct
3. Draw the following in the circle with centre O given below:

O
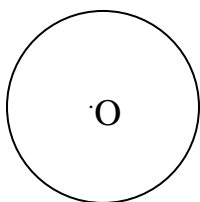
   (a) radius OS   (b) diameter AOB
4. Find some circular objects at home and draw circles with the help of those objects. Find their circumference with the help of a string.
5. Measure the diameter and circumference of the circles given below in mm and record your results in the table that follows them.
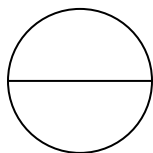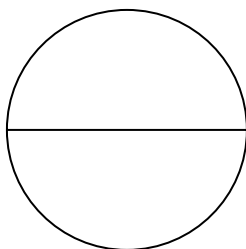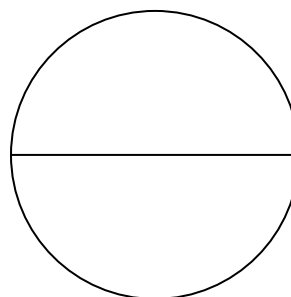
(i)   (ii)   (iii)
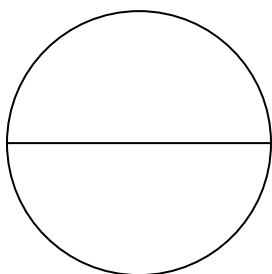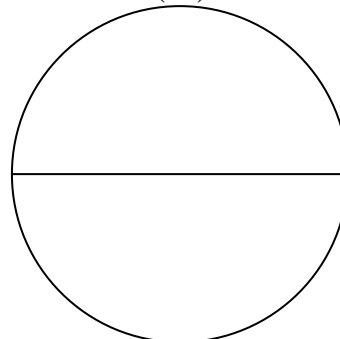
(iv)   (v)

Circle	Diameter	Radius	Circumference

When you have completed the table above, complete the statements below:

The circumference was approximately _____ times the diameter.

6. The radius of some circles is given below. Complete the table

Radius of the circle	Diameter	Circumference
2 cm		
3 cm		
4 cm		
4.5cm		

Tangram

A tangram is an old Chinese puzzle and consists of seven tangram pieces.
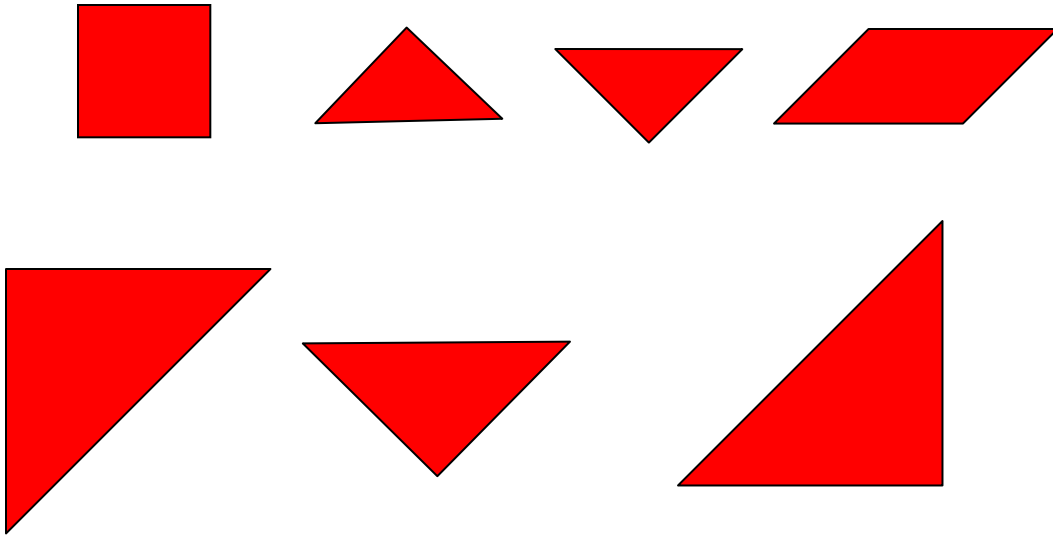
If plastic tangrams are not available, you can make these pieces by pasting the figure given in Activity Sheet 13.1 on a cardboard and cutting the pieces.

Activity 13.3-Creating shapes with tangram pieces

Work in groups to make with all the seven pieces a square, triangle, rectangle and a parallelogram.

Make shapes given in below with all the seven pieces:
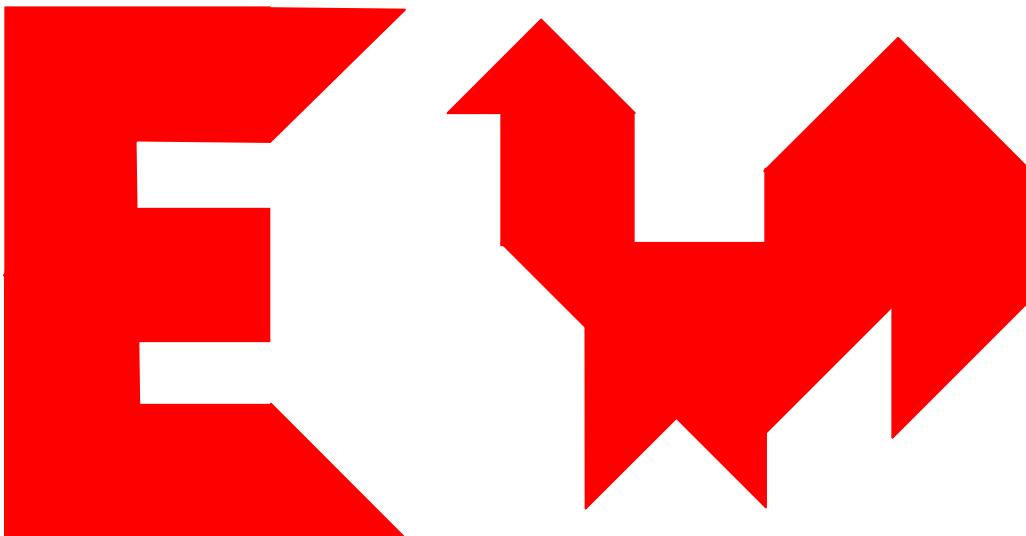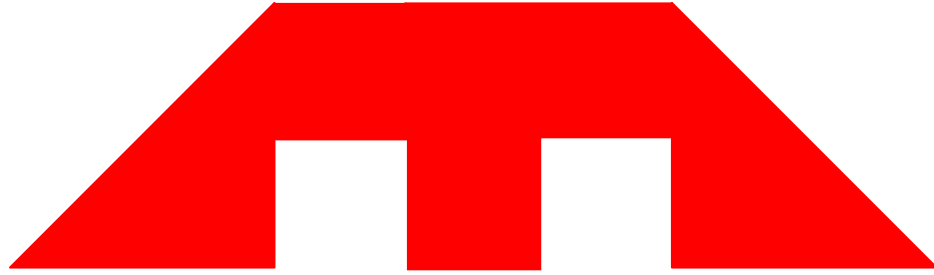
If children have access to computer ask them to go to the following websites and fill in the outline of different figures using all tangram pieces on the computer

1. *http:/pbs.kids.org/sagva/games/tangrams/index.html*
2. http://standards.nctm.org/document/eexample/chap4/4.4/standalone1.htm

You can make many objects using these seven pieces such as animals, persons, letters etc. Many such figures are given in website
http://www.geocities.com/TimesSquare/Arcade/1335/ani-02s.htm.
For those who may not have access to computer some figures from the website are given below:
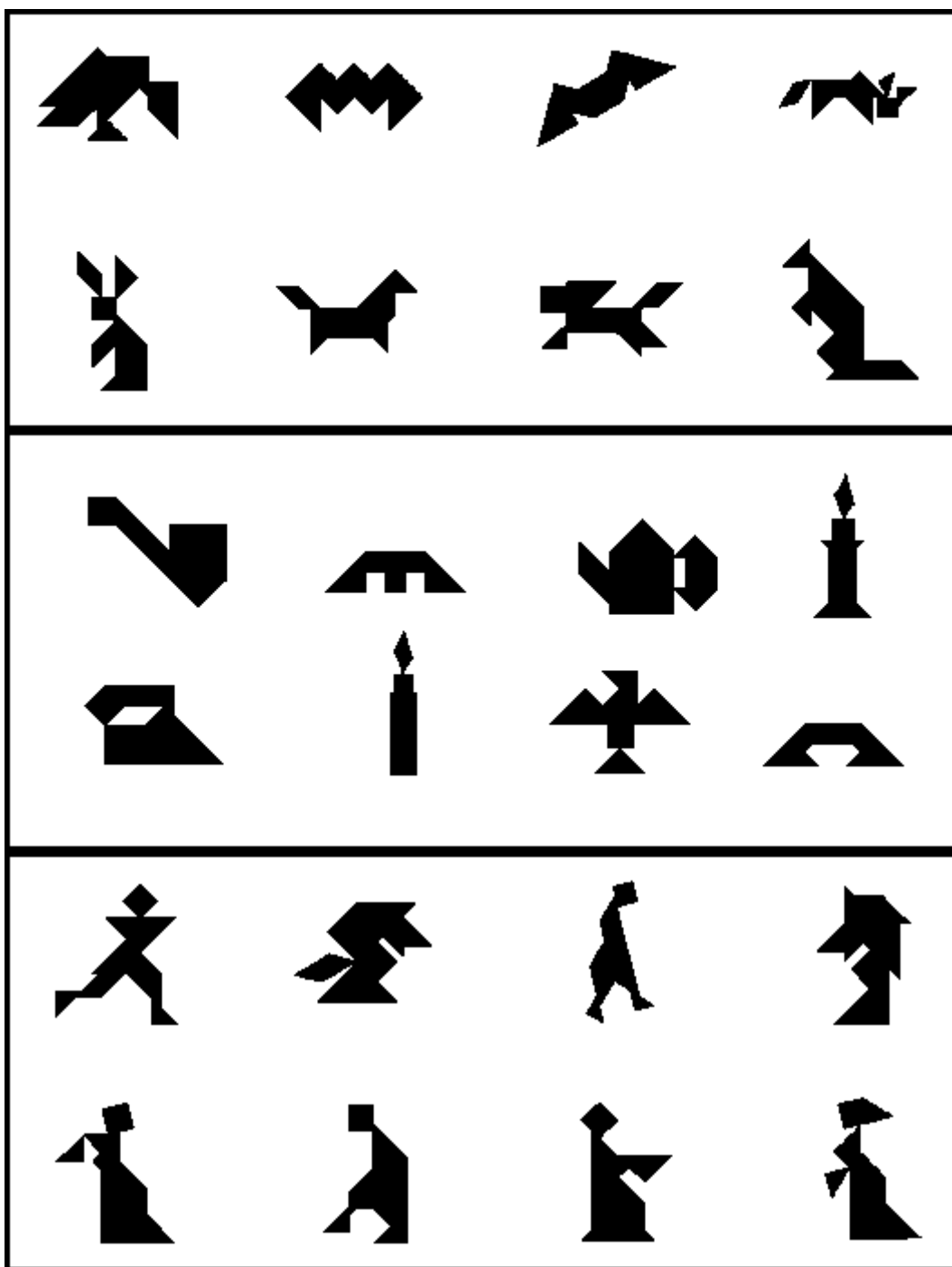
Make some of these and draw their outlines.
Make some new shapes and draw their outlines.
Fill in the outlines of shapes made by others using all seven tangram pieces.

Polygons

Closed figures made of three or more segments are called **polygons**. The line segments are called the sides of the polygon. Triangles, squares, rectangles, parallelograms are examples of polygons. Some more examples of polygons are given below:
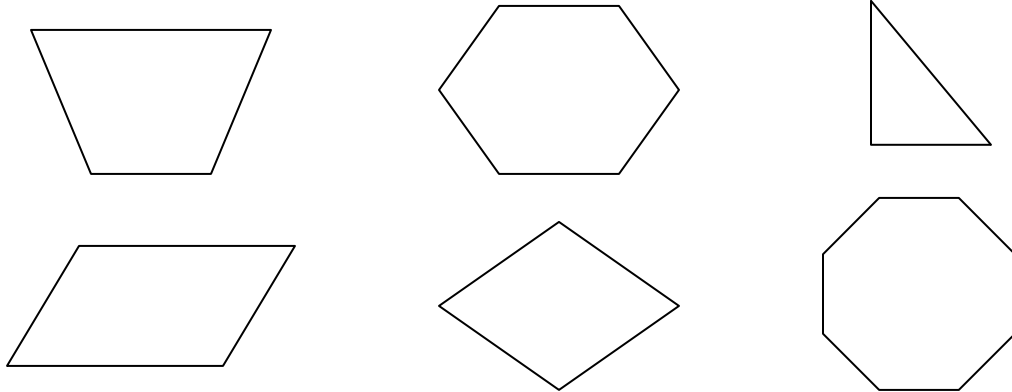
The polygons with three sides are called **triangles**
The polygons with four sides are called **quadrilaterals**.
The polygons with five sides are called **pentagons**.
The polygons with six sides are called **hexagons**
Activity 13.5
Name the following polygons:
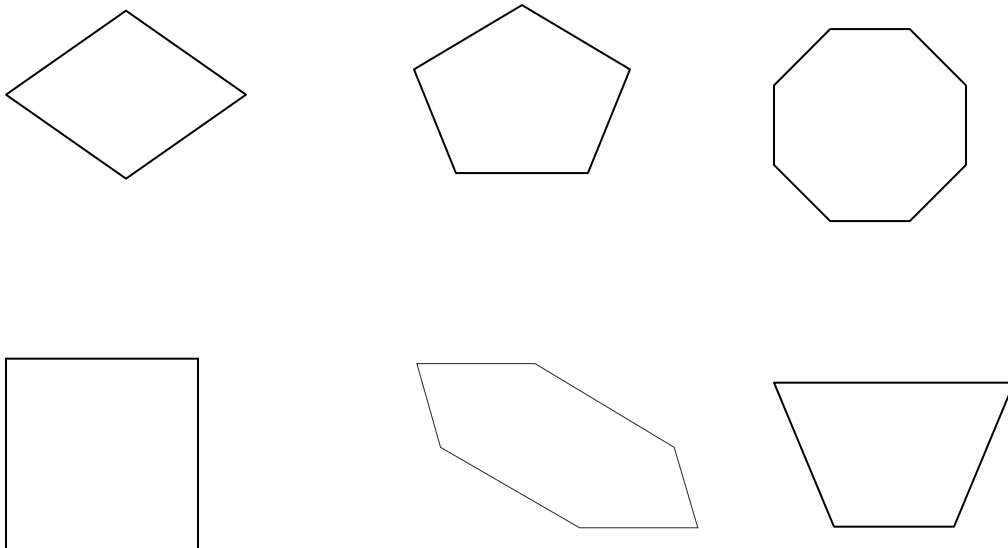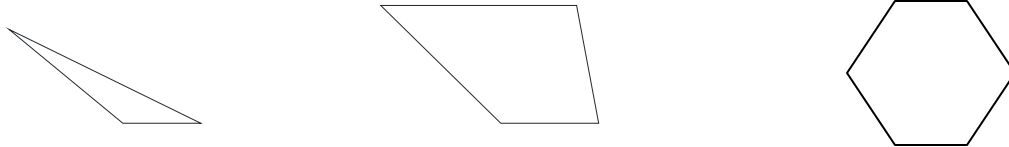
Tiling a region

Tiling is filling a page by sliding, flipping or rotating a shape so that there are no gaps or overlaps.
We can tile a page by drawing around a chip shaped like a parallelogram, a tangram piece or drawing and cutting a parallelogram on a cardboard. Slide the parallelogram so that its edge is adjacent to the side of parallelogram and draw around it again. Continue in this manner until the page is tiled. It will look like the figure given below:
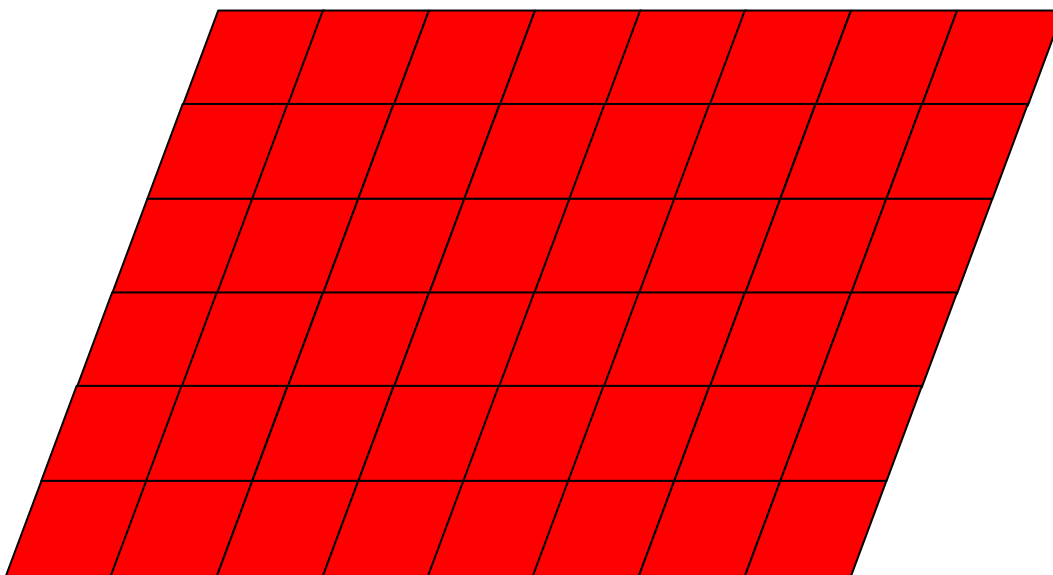
Activity 13.6
Tile a page by a square.
Can you tile a page by a triangle so that there are no gaps or overlaps? (Rotate or flip the triangular piece). Tile it.
Can you tile a surface by circles? If yes, tile it, if no, why?
Can you tile a surface by ovals? If yes, tile it, if no, why?
Can you tile a surface by pentagons? If yes, tile it, if no, why?
Can you tile a surface by a hexagon? If yes, tile it, if no, why?

Tiling a shape with one or two shapes
Activity 13.7
We can also tile different shapes by using similar or different shapes. The hexagon given below is tiled by triangles.
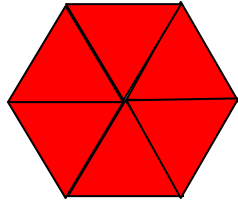
Cut on construction paper several copies of triangles, trapezoids and parallelograms given in Activity Sheet 13. 3.
Tile different figures given below using triangles:
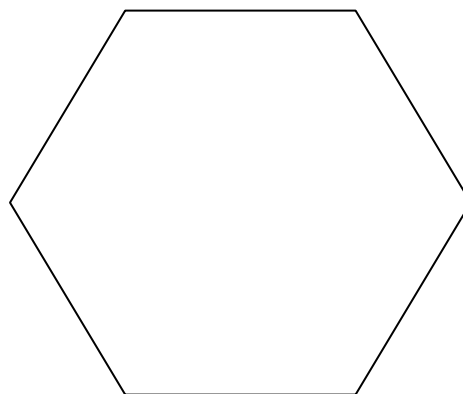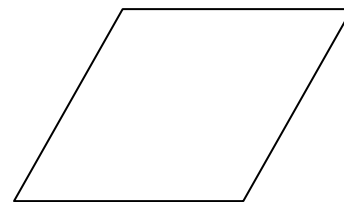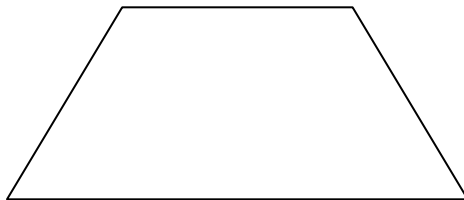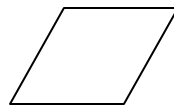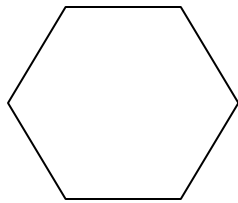
Tile different hexagons using trapezoids.
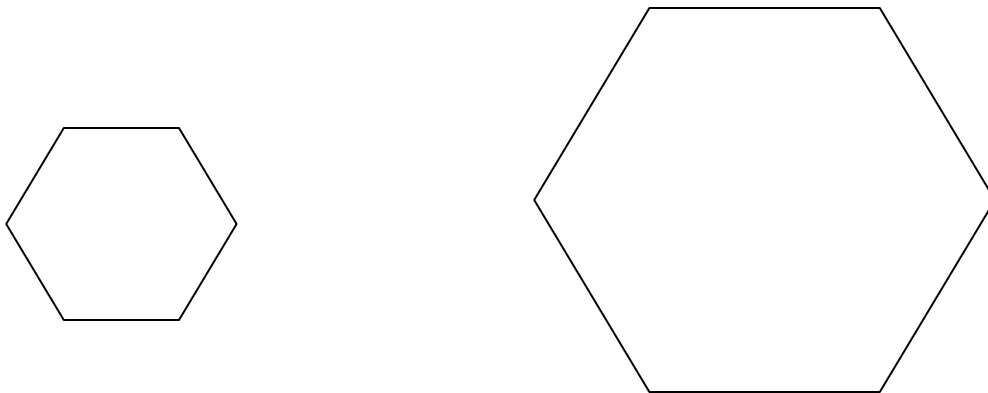
Tile different hexagons using parallelograms

.
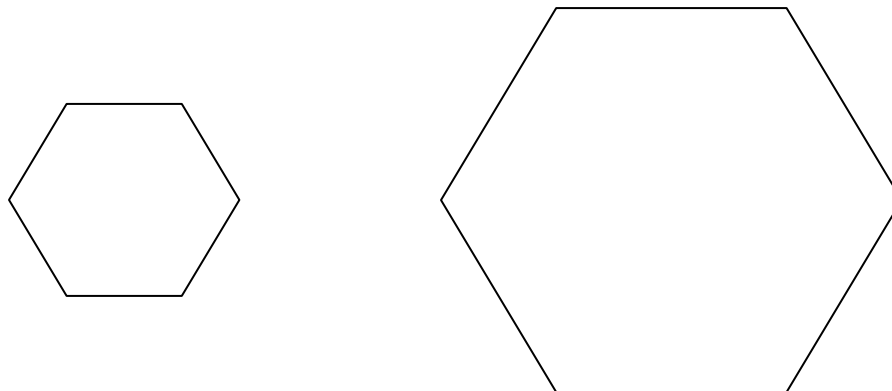
Making objects by folding their nets

A two dimensional figure that can be cut out and folded in a three dimensional box is called its **net**.

Open cubical boxes or 5-face cubes
Trace and fold the net given in Activity sheet 13.4 to make an open box.
How many edges, faces and vertices does it have? Name the shape of its faces,
We can also draw its net on a graph paper. For example, the net given below can be folded into a 5-face cube. Trace it and fold it into an open box.
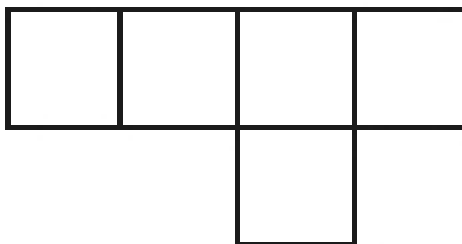
Work in groups to make some more nets for a 5-face cube, cut and fold them to check whether they will fold into a cube or not. How many different nets you can make?

Six-face cube

Show a cube and ask how many edges, faces and vertices does it have?

Trace and fold the net given in Activity sheet 13.6 to make a closed box.

How many edges, faces and vertices does it have? Name the shape of its faces.

We can draw its nets on a graph paper that will fold into a cube.

Demonstrate an example of a 2-D figure that will fold into a cube. For example, figures given below can be folded into a six face cube.

Work in groups to make some more nets for a 6-face cube, cut and fold them to check whether they will fold into a cube or not. How many different nets you can make? (11 nets are possible)
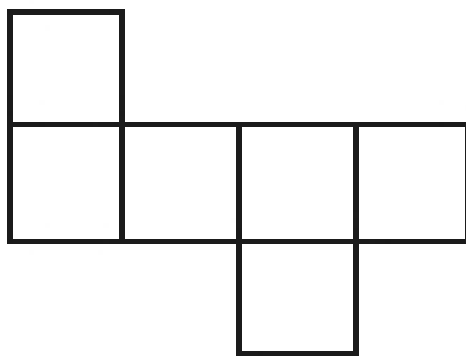
Make Three Dimensional figures with blocks and make their base drawings

Show them structure made with blocks and ask them to copy them.

Make structures using a specific number of blocks.

Copy structures made with blocks by others.

Base drawing of structures
The structure is generally made up of many rows.
We can make a map of a structure in a table that has as many columns as the maximum number of blocks in a row of the structure and as many rows as the structure.
Write in each cell the number of squares that rise above that beginning with the last row.
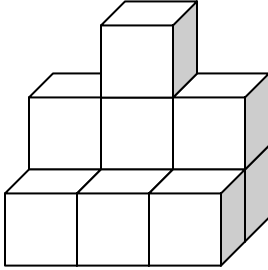
For example the above structure is made up of two rows one behind the other.
First row is made up of 3 adjacent single squares.
Second row is also made up of 3 adjacent squares that have 2, 3 and 2 squares in each column. We can show it in a table as

2	3	2
1	1	1

A map like this is called a **base drawing**.

Exercise 13.2

1. Make base drawings for the structures given below:
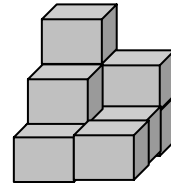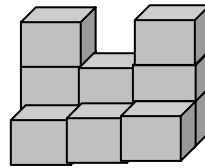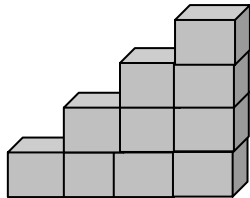
2. Make structures for the base drawings given below:

1	2	3

2	3	2
1	2	2

Symmetry

If a picture can be folded along a line so that the two parts cover each other exactly, then the picture is said to be symmetrical and the line is called the line of symmetry. We find many examples of symmetrical things around us:
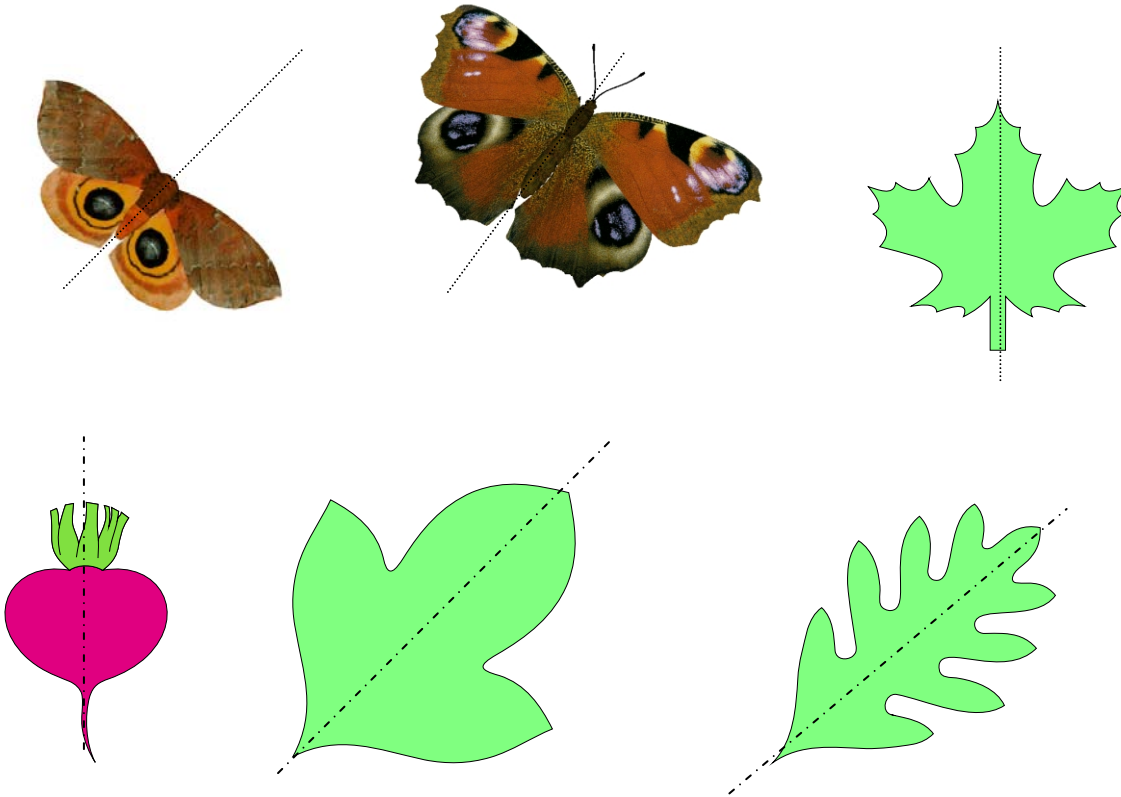
We can make symmetrical drawings with crease as a line of symmetry by folding a paper and drawing a figure along the fold and cutting it, when you unfold it you will get a symmetrical object with the fold as line of symmetry.
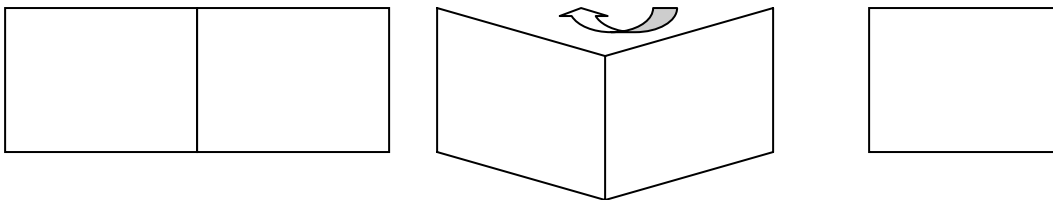
We can also find if geometrical figures have lines of symmetry by checking if we can fold it so that the two halves cover each other exactly.

The dashed lines in the figures given below are lines of symmetry.
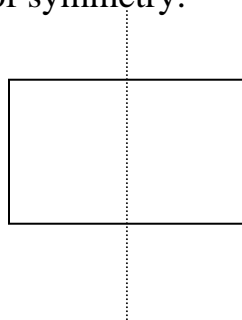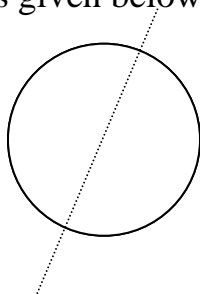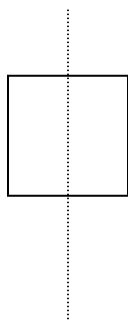
The dashed lines below are not lines of symmetry. They do cut the figures in half, but they don't create mirror-image halves.
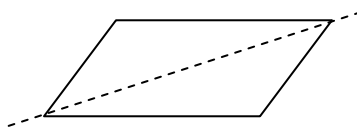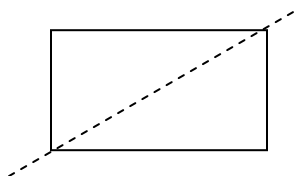
Exercise 13.3

1. Which of the following figures are symmetrical? Mark a tick under it.
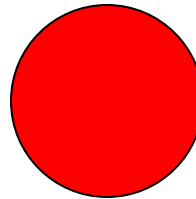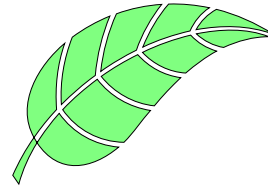
2. Find some pictures of objects that are symmetrical, paste them in your notebook, and draw lines of symmetry in those.
3. Make some symmetrical shapes by folding a piece of paper into two halves, drawing shapes and cutting them out. Paste these in your notebook.
4. Trace and cut the pictures given below and find all lines of symmetry by folding these.
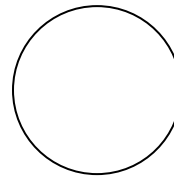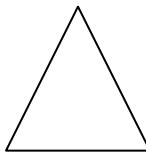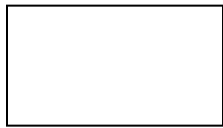
5. Draw all lines of symmetry in the following figures
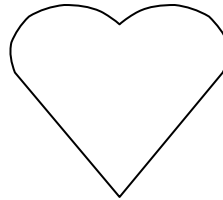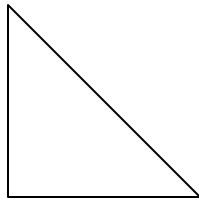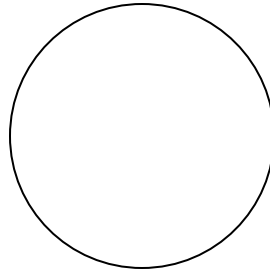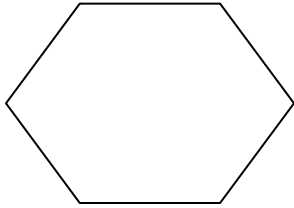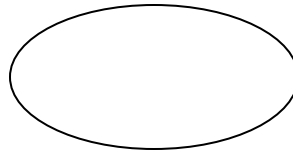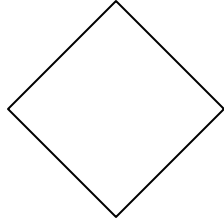
6. Draw a square, a rectangle, a triangle and a line on a dot paper-Activity Sheet 13.5 and draw all lines of symmetry in them.
7. Complete figures on the dot paper given in Activity Sheet 13.6 so that the dashed line is the line of symmetry.

Top, Front and side view of objects

Objects look different when seen from different positions.

For example, the top, front, and side views of a table are
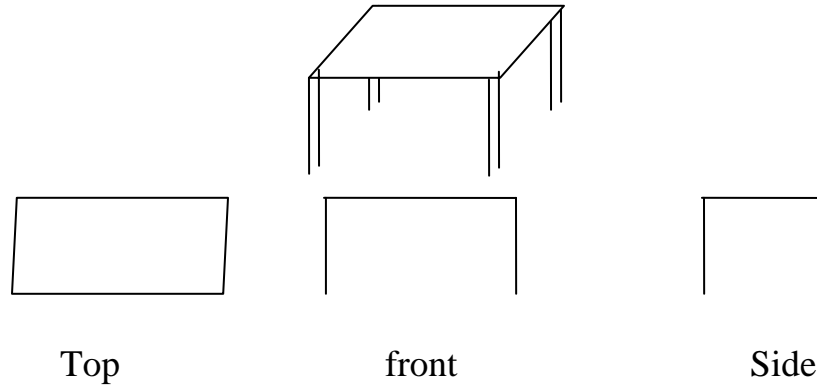
Top	front	Side

Similarly the top, front, and side views of a cylinder are
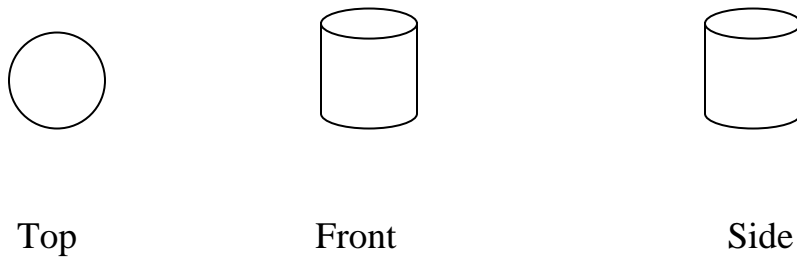
Top	Front	Side

The front and side views of a cylinder are the same.

The top, front and side views of the structure made with blocks given below are
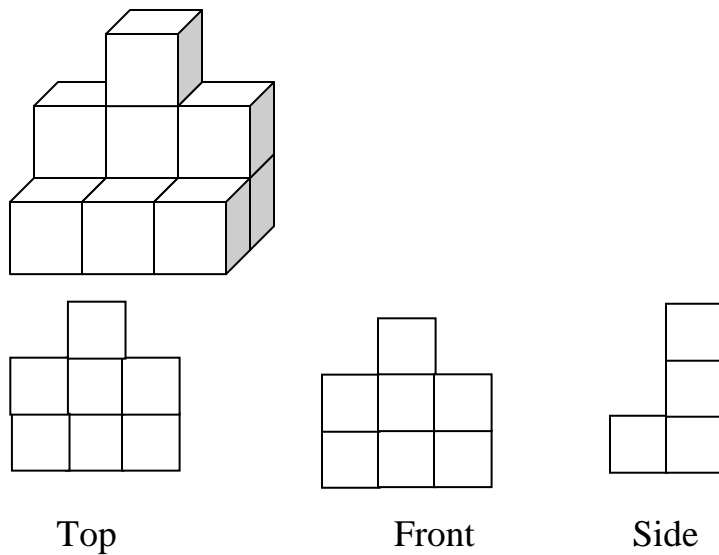
Top	Front	Side

Exercise 13.4

1. Draw the top, front and side view of models of some objects
2. Draw the top, front and side view of a cone.
3. Draw the top, front and side view of structures made with blocks whose pictures are given below:
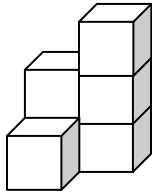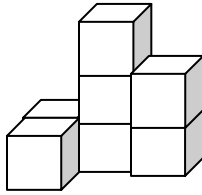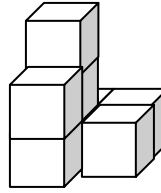
(a)   (b)   (c)

4. Make structures with blocks and draw the top, front and side view of those.

ACTIVITY SHEETS

Activity Sheet 3.1

Multiplication Table

×	0	1	2	3	4	5	6	7	8	9
0	0	0	0	0	0	0	0	0	0	0
1	0	1	2	3	4	5	6	7	8	9
2	0	2	4	6	8	10	12	14	16	18
3	0	3	6	9	12	15	18	21	24	27
4	0	4	8	12	16	20	24	28	32	36
5	0	5	10	15	20	25	30	35	40	45
6	0	6	12	18	24	30	36	42	48	54
7	0	7	14	21	28	35	42	49	56	63
8	0	8	16	24	32	40	48	56	64	72
9	0	9	18	27	36	45	54	63	72	81

Activity Sheet 6.1
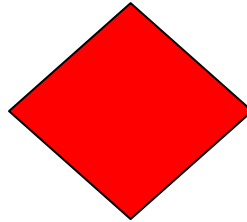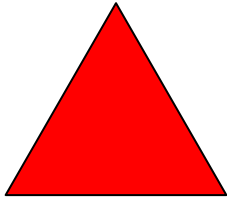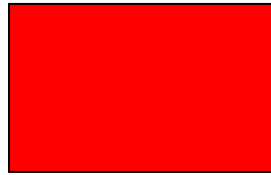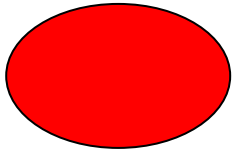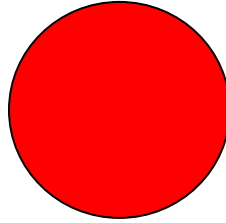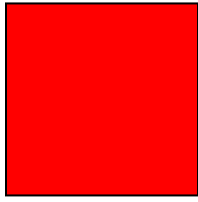
Activity Sheet 6.2

(a)

(b)

(c)

(d)

(e)

(f)

Activity sheet 8.1

Activity Sheet 12.1
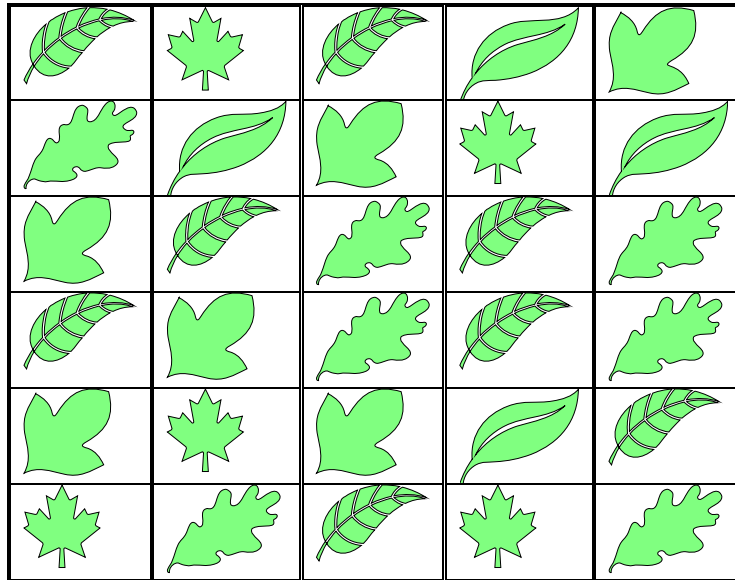
Activity Sheet 12.2

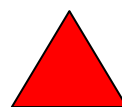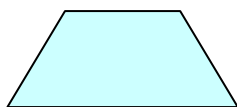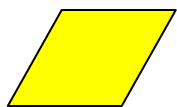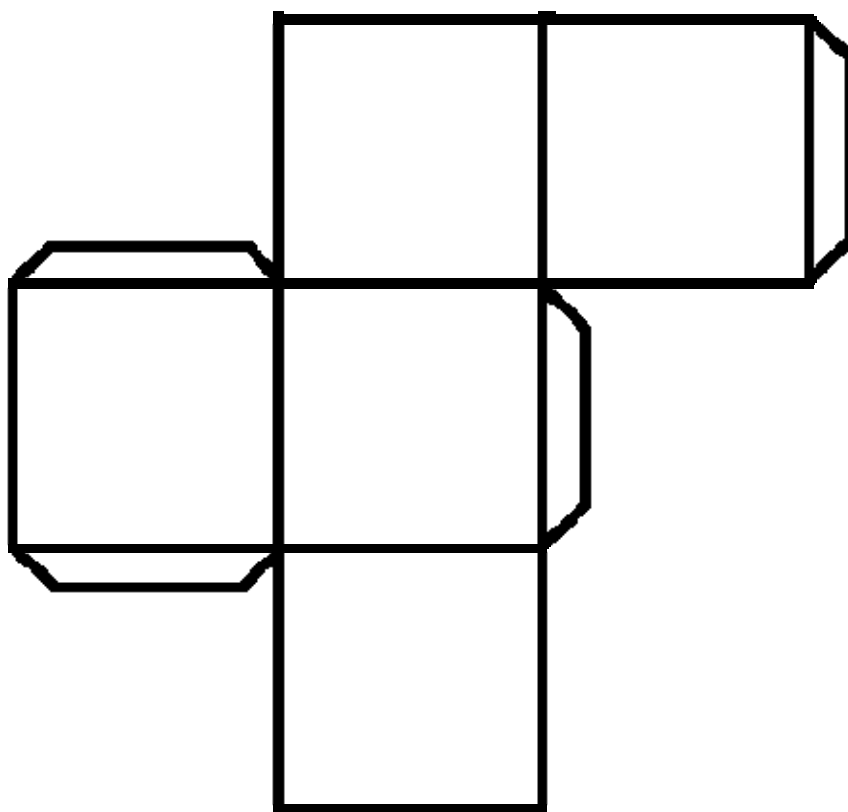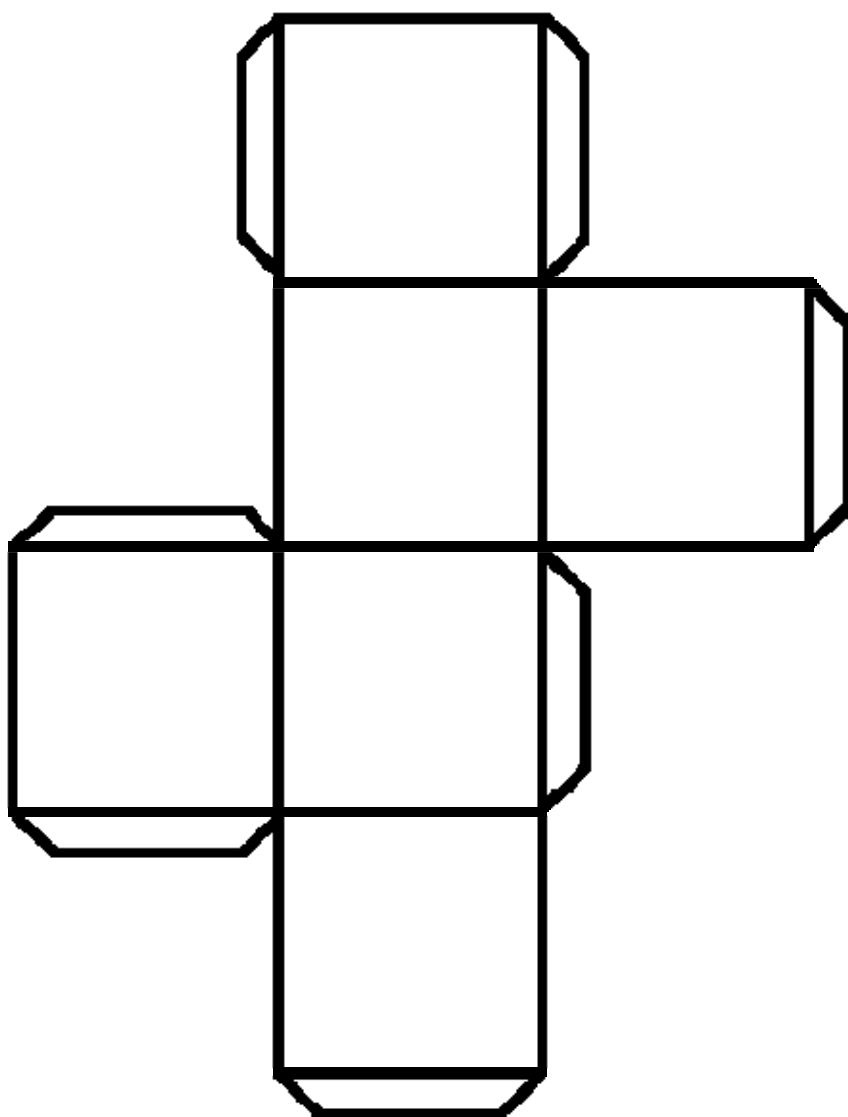|									

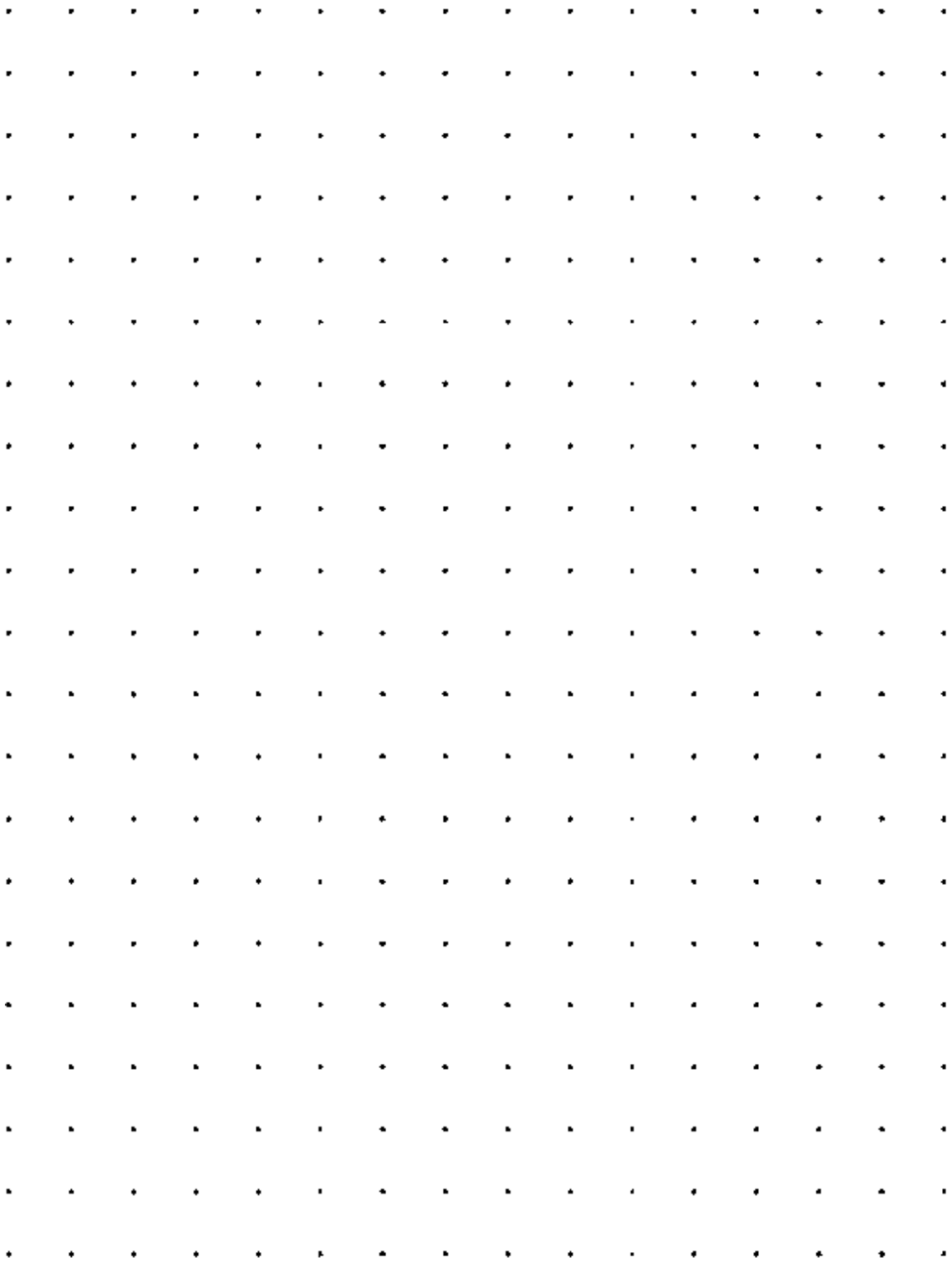# Activity Sheet 13.1
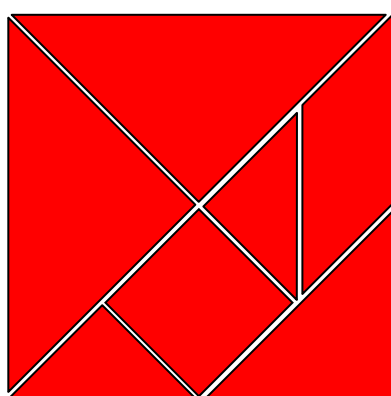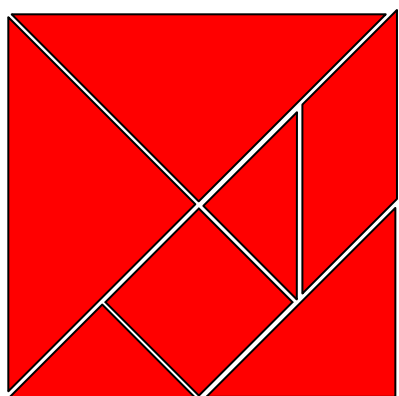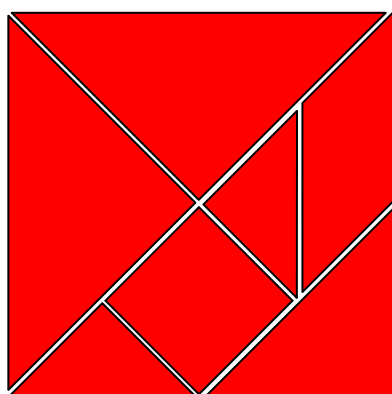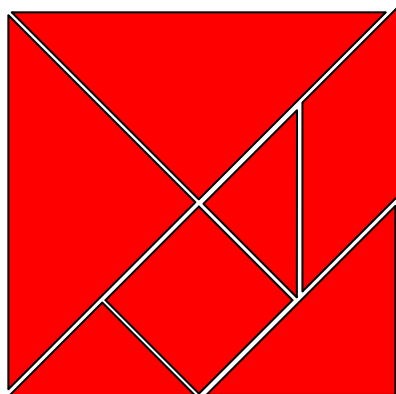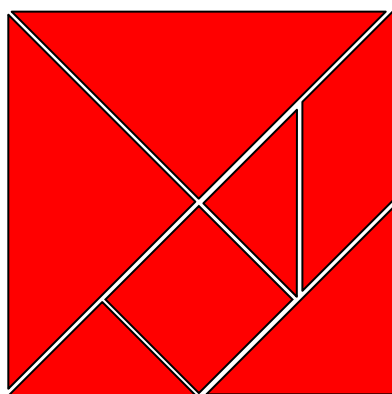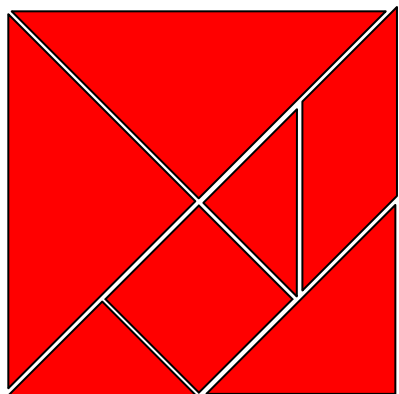
Activity Sheet 13.2
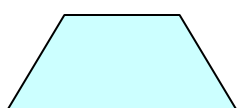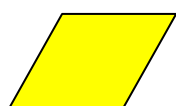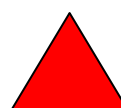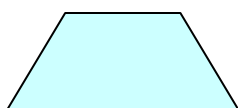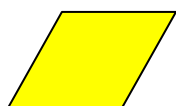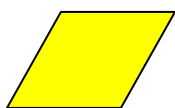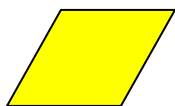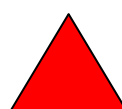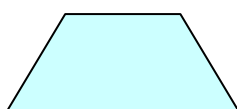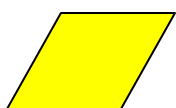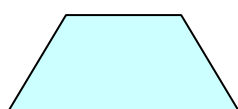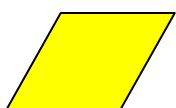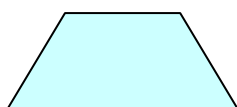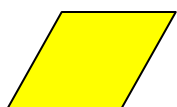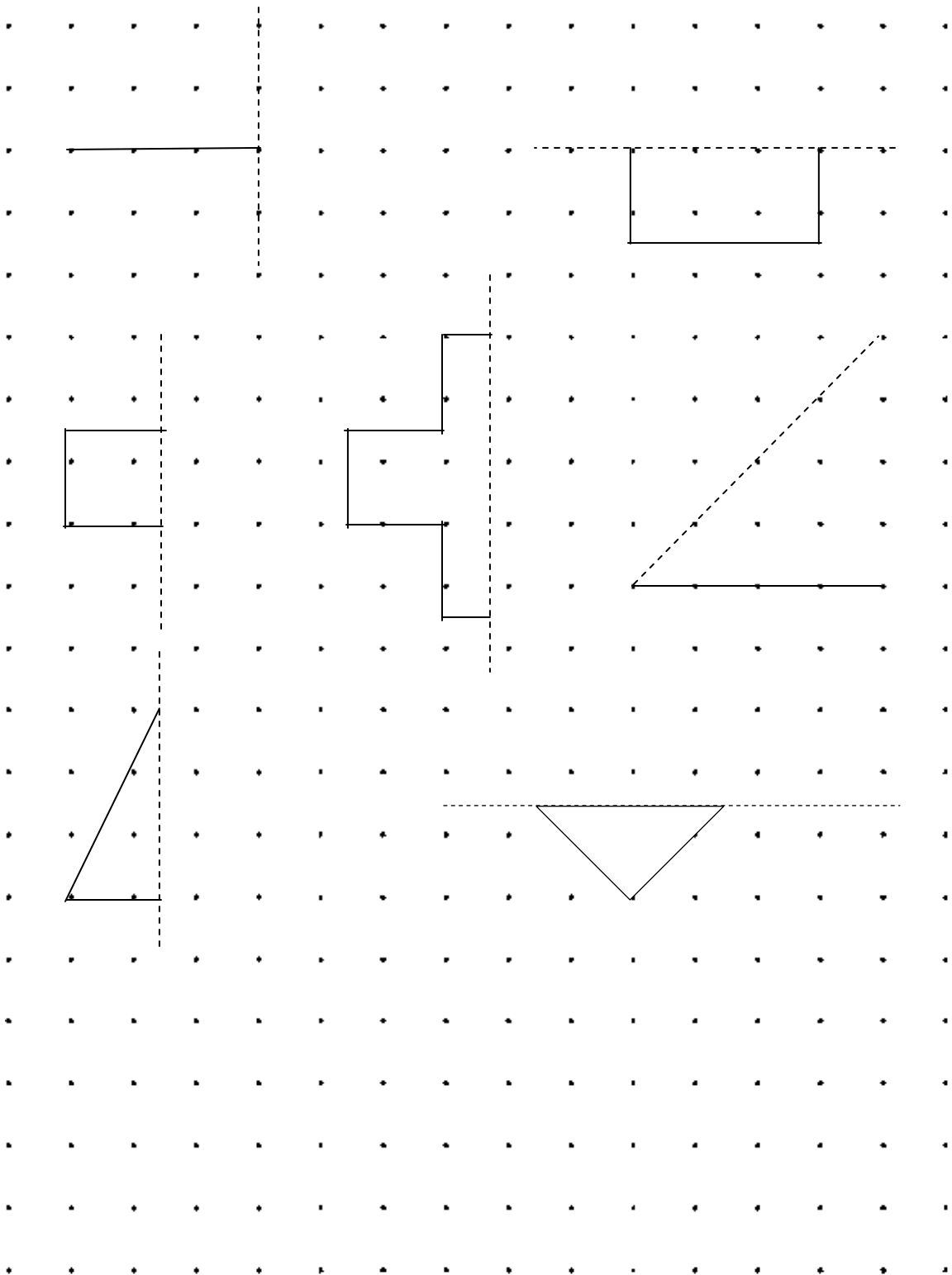
Activity Sheet 13.3

Activity Sheet 13.4

Activity Sheet 13.5

Activity Sheet 13.6

Answers to Selected Exercises

Exercise 1.1

3. (a) 743   (b) 608   (c) 4000   (d) 3757   (e) 8364
   (f)2406   (g) 9009   (h) 7085   (i) 3001   (j) 1708
4. (a) Sixty seven   (b) Eight   (c)Seven hundred two
   (d)Two thousand eight hundred ninety four
   (e) Nine thousand seven hundred four
   (f) Six thousand nine
   (g) Eight thousand fifty six
   (h) One thousand eight hundred ninety
   (i) Seven thousand fifty two
   (j) Four thousand five
5. (a) 1006   (b) 6735   (c) 10,000   (d) 2010   (e) 1000
6. (a) 499   (b) 4,686   (c) 1999   (d) 3,259   (e) 4499
7. (a) 4,327 (b) 8705   (c) 3040   (d) 9506   (e) 2690
8. (a) 6,952 = 6 Thousands + 9 Hundreds + 5 Tens + 2 Ones
   (b) 8,478 = 8 Thousands + 4 Hundreds + 7 Tens + 8 Ones
   (c) 5089 = 5 Thousands + 0 Hundreds + 8 Tens + 9 Ones
   (d) 6703 = 6 Thousands + 7 Hundreds + 0 Tens + 3 Ones
   (e) 4002 = 4 Thousands + 0 Hundreds + 0 Tens + 2 Ones
9. (a) 548   (b) 7634   (c) 8043   (d) 9008
10. (a) 0   (b) 6   (c) 4   (d) 7
11. (a) 80   (b) 4   (c) 2000   (d) 400   (e) 8000
    (f) 0   (g) 1000   (h) 800   (i) 3000   (j) 0
12. (a) 710   (b) 8078

Exercise 1.2

3. (a) 25,467   (b) 43,695   (c) 60,247   (d) 33075
   (e) 58,405   (f) 80,007   (g) 90,000
4. (a) Seventy eight thousand five hundred eighty three
   (b) Fourteen thousand eight hundred fifty one
   (c) Sixty seven thousand nine hundred eight
   (d) Fifty four thousand sixty four
   (e) Forty eight thousand seven
   (f) Thirty thousand
   (g) Seventy thousand five
   (h) Twenty four thousand six

(i) Fourteen thousand seventy eight

(j) Fifty thousand seven hundred eighty six

5. (a) 24,001　　　　(b) 56,720　　　　(c) 43,500

　(d) 65,000　　　　(e) 40,000　　　　(f) 56,848

6. (a) 99　　　　　(b) 45,674　　　　(c) 78,779

　(d) 66,799　　　　(e) 33,999　　　　(f) 49,999

7. (a) 8　　　　(b) 8　　　(c) 6　　　(d) 4　　　(e) 3

8. (a) 800　　　　(b) 9,000　　　(c) 3　　　(d) 0　　　(e) 300

　(f) 90,000　　　(g) 10,000　　　(h) 40　　(i) 800

Exercise 1.3

2.

Lakhs	Ten thousands	Thousands	Hundreds	Tens	Ones
3	4	7	2	8	9
2	4	5	3	9	2
8	0	0	5	6	2
7	8	2	0	0	5
4	5	0	0	0	6
5	0	0	0	0	4

3. (a) 60,347　　　(b) 2,35,834　　　(c) 5,07,406　　　(d) 7,42,093

　(e) 8,00,009　　　(f) 3,00,401　　　(g) 9,30,204

4. (a) Four lakh seventy five thousand nine hundred seventy three

　(b) Five lakh sixty seven thousand　eight hundred five

　(c)　Seven lakh four thousand eight hundred ninety

　(d) Three lakh eighty thousand sixty three

　(e)　Nine lakh thousand ninety nine nine hundred ninety nine

　(f) Three lakh six

　(g) Two lakh

5. (a) 80,000　　　(b) 5,00,000　　　(c) 700　　(d) 6,000

　(e) 70　　　　(f) 0

Exercise 1.4

1. (a) >　　　　(b) >　　(c) <　　　(d) >　　(e) <

2. (a) 25, 30, 67　(b) 462, 760, 873　　　(c) 546, 4,906, 8,531

　(d) 4,785, 4,794, 34,762

3. (a) 78, 58, 23　(b) 782, 567, 349　(c) 45,982   25,873   9,432

(d) 85,964   85,329   67,413

4. 1,000   5. 99,999   6. 239   7.8,542

8. 249, 294, 429, 492, 924, 942   9. 510, 501, 150, 105, 51, 15

Exercise 2.2

1. 2,0	0, 10	1, 2
2. 23	5,623	17,617
5	475	52
134	2,659	432
-----	--------	---------

3. 85,925	68,258	78,984
92,184	1,00,243	1,01,551
1,11,583	42,961	1,02,754

Exercise 2.3

1. (a) 54	(b) 106	(c) 604	(d) 502	(e) 255	(f) 105
3. 3245	2258	1794	5185	3152	2372
888	3849	1304	1517	1659	1558

Exercise 2.4

12,210	32,113	32,276
20,738	19,626	21,287
10,172	28,608	1,789
32,456	23,949	14,933
58,268	13,685	9,511

Exercise 2.5

1. (a) 40	(b) 40	(c) 370	(d) 550
2. (a) 200	(b) 600	(c) 700	(d) 1300
(e) 2500			
3. (a) 3000	(b) 4000	(c) 3000	(d) 41000
(e) 73,000			
4. (a) 110	(b) 70	(c) 30	
5. (a) 500	(b) 600	(c) 500	
6. (a) 12,000	(b)14,000	(c) 3000	(d) 8000

Exercise 2.6

1.   3   63   23   105   33
2. 10 - (2 + 4)   50 – (12 + 16)   (45 – 22) + 4
   (100 –37) – 10   500 – (67 + 42)
3. (a) 135   (b) 15   (c) 150 – (120 + 15)
4. (a) 1234 – 75 + 135   (b) 1294
5. (a) 40 – 5 + 7   (b) 42

Exercise 3.1

3. (a) 7   (b) 6   (c) 2   (d) 21   (e) 6
   (f) 4   (g) 6   (h) 7
4. (a) 30   (b) 270   (c) 1,800   (d) 1240   (e) 3780   (f) 54820
5. (a) 90   (b) 250   (c) 480   (d) 480   (e) 630   (f) 280
6. (a) 400   (b) 6300   (c) 7500   (d) 1200   (e) 4900   (f) 7200
7. (a) 86   (b) 66   (c) 96   (d) 310   (e) 184   (f) 644
   (g) 224   (h) 666   (i) 486   (j) 396   (k) 2706   (l) 5384
   (m) 21596   (n) 6804   (0) 4125   (p) 5931
   (q) 2208   (r) 1184   (s) 6963   (t) 4684
   (u) 26835   (v)29904   (w) 18952   (x) 51667

Exercise 3.2

1. (a) 120   (b) 240   (c) 2443   (d) 3624
   (e) 7020   (f) 18528   (g) 5024   (h) 43056
   (i) 28469   (j) 33515   (k) 30054   (l) 35000
2. (a) 192   (b) 1288   (c) 2700   (d) 1666
   (e) 4810   (f) 6230   (g) 4350   (h) 1541
   (i) 7216   (j) 2520   (k) 3680   (l) 5952
3. (a) 3962   (b) 14014   (c) 37012   (d) 41952
   (e) 38385   (f) 28008   (g) 72842   (h) 16910
   (i) 31020   (j) 65189   (k) 74292   (l) 37500
4. (a) 98362   (b) 369102   (c) 296175   (d) 152532
   (e) 213525   (f) 398912   (g) 307330   (h) 323952
   (i) 131700   (j) 181442   (k) 120681   (l) 517408
7.(a) 3024   (b) 4368   (c) 851   (d) 3864
   (e) 40416   (f) 21440   (g) 160225   (h) 382375
   (i) 401948
Exercise 3.3

1. 48   2. 210   3. 120   4. 2250   5.5750
6. 60, 35   7.720   8. 364   9.30

Exercise 4.1

5. (a) even   (b) 2, 4, 6, 8, 0   (c) yes   (d) odd
   (e) 1, 3, 5, 7, 9   (f) yes   (g) yes   (h) yes
6. 6, 20, 64   7. 1, 63, 57, 91   8. yes   9. yes
10. 4 + 3 =7   11.30, 60
12. (a) no   (b) yes   (c) yes
13. $2 \times 3 \times 4, 1 \times 6 \times 4, \quad 1 \times 12 \times 2, 1 \times 8 \times 3$

14. (a) 0 or 5   (b) multiples   (c) factors

15. 70, 25   16.24, 48, 96

17. (a) 1, 2, 3, 4, 6, 12   (b) 1, 2, 5, 10   (c) 1, 2, 3, 4, 6, 8, 12, 24
    (d) 1, 17
18. no   19. no, 9   20. yes
21. (a) 40, 12, 2, 30
    (b) 40, 25, 5, 30 because they end in 0 or 5
    (c) 40 because 40 is a multiple of 8 as $8 \times 5 = 40$
    (d) 40 and 30 as these are multiple of 10.
22. (a) 23, 25, 5 as these are odd numbers.
    (b) 23, 12, 2 as the digit in one's place is not 0 or 5.
    (c) 23, 25, 12, 5, 2, 30 as these are not multiples of 8.
    (d) 23, 25, 12, 5, 2 as the digit in one's place is not 0.

Exercise 4.3

1. (a) 40   (b) 30   (c) 60   (d) 50
   (e) 80   (f) 50
2. (a) 300   (b) 800   (c) 200   (d) 300
   (e) 500   (f) 400
4. (a) 60   (b) 60   (c) 50   (d) 80
5. (a) 40   (b) 30   (c) 20   (d) 30
6. (a) 3 tens   (b) 2 tens   (c) 1 ten
7. (a) 60 tens   (b) 50 tens   (c) 30 tens   (d) 45 tens
   (e) 62 tens
8. (a) 76   (b) 49   (c) 81   (d) 95   (e) 27

9. (a) 2 R 10   (b) 3 R 2   (c) 2 R 10   (d)3 R 7
   (e) 7   (f) 5 R 9   (g) 2 R 17   (h) 1 R 28
10. (a) 7 R 44   (b) 4 R 29   (c) 8 R 48   (d) 9 R 47
   (e) 22 R 13   (f) 11 R 21   (g) 16 R 10   (h) 10 R47
11. (a) 40 R 12   (b) 20 R 12   (c) 9 R 14
   (d) 20 R 3   (e) 19 R 15   (f) 20 R 33
   (g) 26 R 17   (h) 14 R 6

Exercise 4.4

1. 235   2. 4   3. 70   4. 12, Rs. 4   5. 5   6. 36
8. 25   9.32   10. 22

Exercise 7.1

6. (a) Rs. 3.35   (b) Rs. 7.50   (c) Rs. 4.05   (d) Rs.100.00
7. (a) Rs. 3   (b) Rs. 14   (c) Rs. 42.50
8. (a) Rs. 46   (b) Rs.19   (c) Rs. 105
9. Rs. 24
10.(a)Rs. 27.50   (b) Rs. 22.50
11.Rs. 75
12.(a) Rs. 34   (b) Rs. 66
13.(a) Rs. 14   (b) Rs.2
14.(a) Rs. 3   (b) Rs. 12
15.(a) Rs. 48   (b) Rs. 8   (c) Rs. 4   (d) Rs.40

Exercise 8.1

4. (a) cm   (b) m   (c) cm   (d) cm   (e) cm   (f) m
5. (a) 2   (b) 4   (c) 8
6. (a) 4   (b) 7   (c) 6   (d) 8   (e) 4   (f) 1
12. B   13. B   14. B   15. 200   16. 2

Exercise 8.2

1. (a) 935 m and 80 cm   (b) 5 m   (c) 42 m and 15 cm
   (d) 302 m and 20 cm
2. (a) 526 m and 44 cm   (b) 2 m and 55 cm
   (c) 3 m 70 cm   (d) 8 m and 80 cm
   (e) 184 m and 80 cm

3. 23 m   4. 745 m   5. 4 m   6. 3 m

Exercise 9.1

5. (a) g   (b) kg   (c) g   (d) kg
  (e) kg   (f) g

6. (a) $\dfrac{1}{2}$ (b) $\dfrac{1}{4}$ (c) $\dfrac{3}{4}$

7. (a) Rs. 8   (b) Rs. 32   (c) Rs. 4

8. (a) Rs. 20   (b) Rs. 40   (c) Rs. 10   (d) Rs. 5

9. (a) 400 g   (b) 600 g   (c) 1 kg 800 g   (d) 3 kg

Exercise 9.2

4. (a) 750 g   (b) 450 g   (c) 775 kg
  (d) 5 kg 750 g   (e) 6 kg 200 g   (f) 8 kg 150 g

5. (a) 232 g   (b) 450 kg   (c) 3 kg 250 g
  (d) 17 kg 300 g   (e) 147 kg 850 g   (f) 246 kg 850 g

6. 4 kg   7. 800 g   8. 118 kg 500 g

9. 1035 kg

Exercise 10.1

11. (a) 500ml   (b) 100 ml and 50 ml
  (c) 1l and 500 ml   (d) 200 ml and 50 ml
  (e) First pour 500 ml and then pour back 100 ml
  (f) 2l, 1l ,500ml, 200 ml and 50 ml

12. (a) First pour 3 l and then 1 l
  (b) First pour 5 l and then pour back 2 l
  (c) Pour 1 l 4 times
  (d) Pour 2 l twice and then 1 l

13. (a) Half of 1 l   (b) One-fourth of 1 l

14. (a) Rs. 8   (b) Rs. 32   (c) Rs. 4

15. (a) Rs. 24   (b) Rs. 3   (c) Rs. 6

16. (a) 488 l   (b) 289 l   (c) 898 l

Exercise 10.2

3. 488 l   289 l   898 l

4. 12322 l   764 l 200 ml

5. 513 l   414 l 750 ml

6. (a) Use 2 l and 1 l

  (b) Use 2 litre twice and 1 l once

7. 31 l   8. 1 l and 300 ml   9. 368 l   10. 40 l, 25 l

Exercise 11.1

1. (a) 7:20   (b) 4:40   (c) 12 o' clock   (d) 10:12
   (e) 7:14   (f) 9:15

2. (a) 10 minutes past 4, 50 minutes to 5
   (b) Half past 5, 30 minutes past 5, 30 minutes to 6
   (c) 45 minutes past 8, 15 minutes to 9, quarter to 9
   (d) 32 minutes past 4, 28 minutes to 5
   (e) 15 minutes past 5, 45 minutes to 6, quarter past 5
   (f) 13 minutes past 7, 47 minutes to 8
   (g) 12: 00

3. (a) 4, 12   (b) Mid way between 5 and 6, 6
   (c) Between dots 3 and 4 between 8 and 9, 9
   (d) About mid way between 8 and 9, second dot after 6

5. (a) 4:30   (b) 7 o' clock   (c) 3:45   (d) 11:13

6. (a) 9:45   (b) 2:15   (c) 9:30   (d) 6:37

Exercise 11.2

1. (a) a.m.   (b) a.m.   (c) p.m.   (d) p.m.

2. (a) a.m.   (b) p.m.   (c) p.m.   (d) a.m.

3. 9 and a half hours

4. (a) 5:40 a.m.   (b) 5:20 p.m.   (c) 9:55 p.m.   (d) 12:40 p.m.

5. 27 minutes   6. 1 hour 21 minutes   7. 8:15 p.m.   16. 8 days
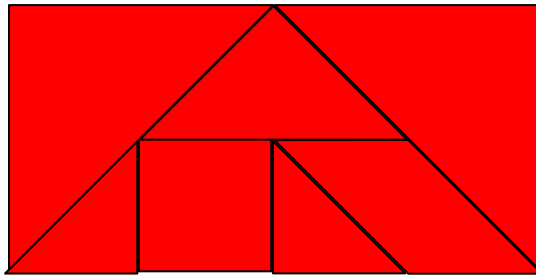
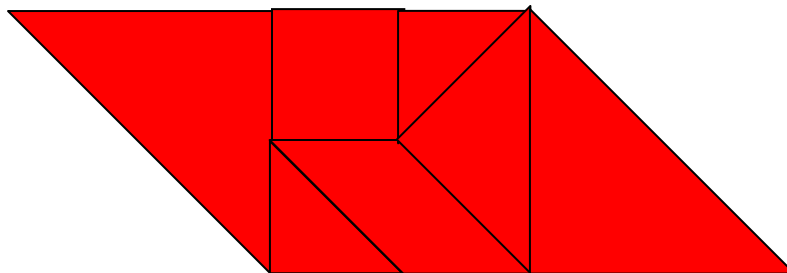17. 25 days   18. 3rd January

Activity 13.3

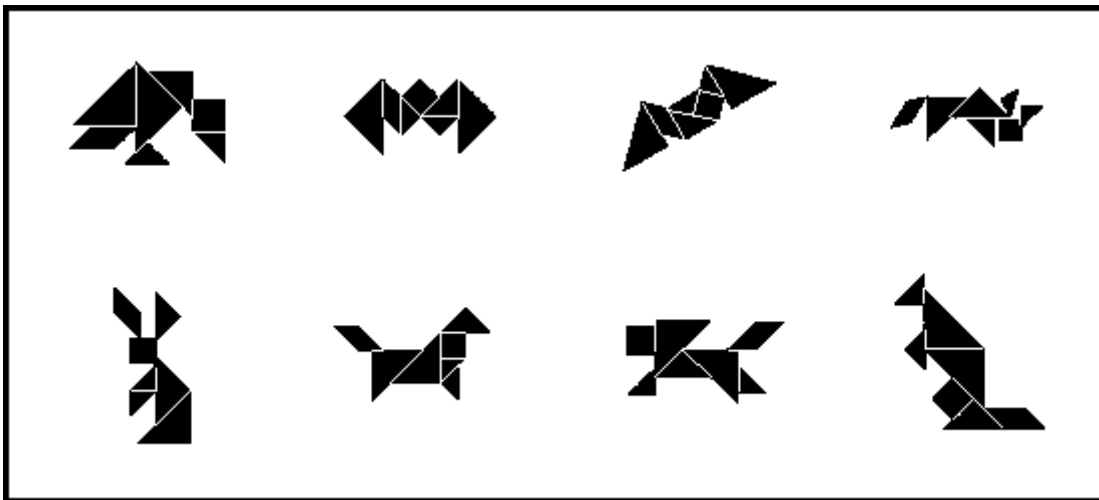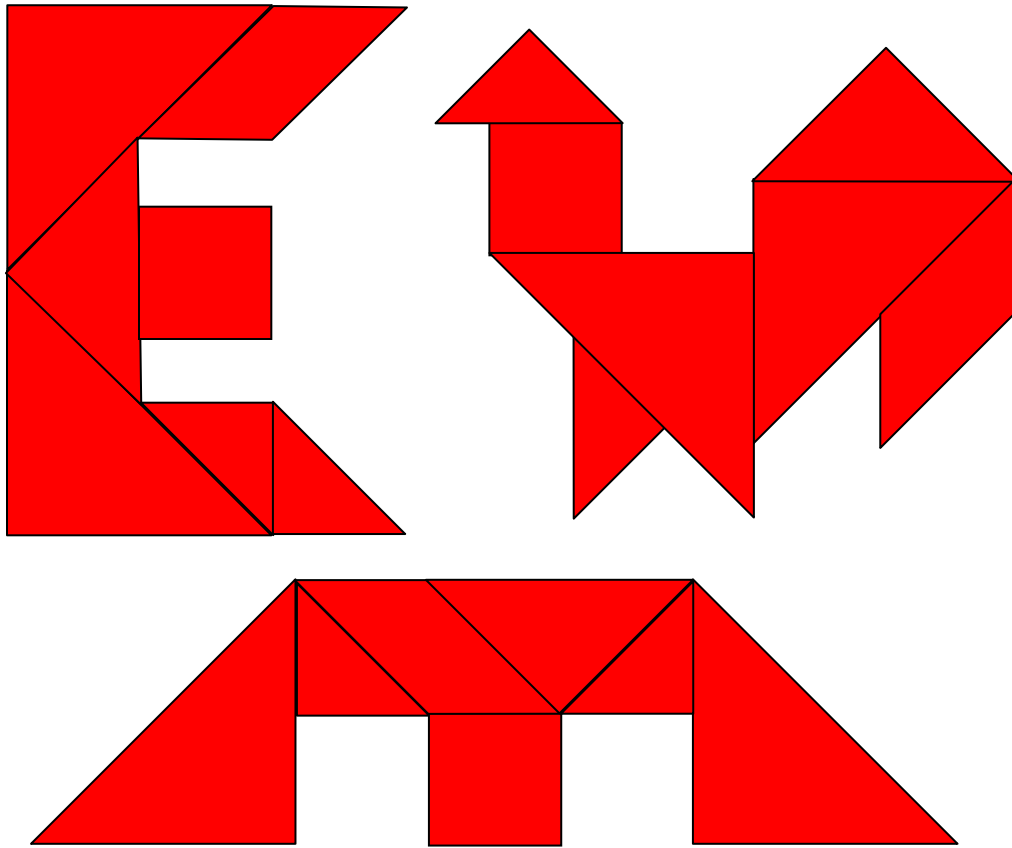Geometrical shapes made with all the seven pieces

Triangle
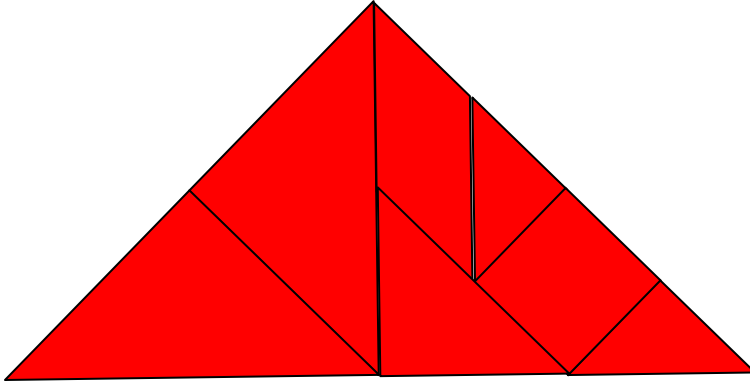
Rectangle

Parallelogram

Animals
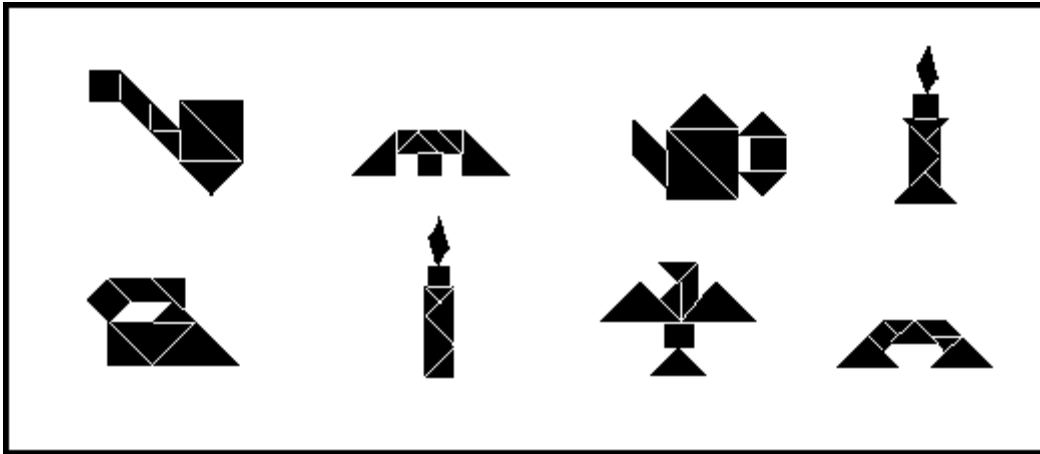
Objects
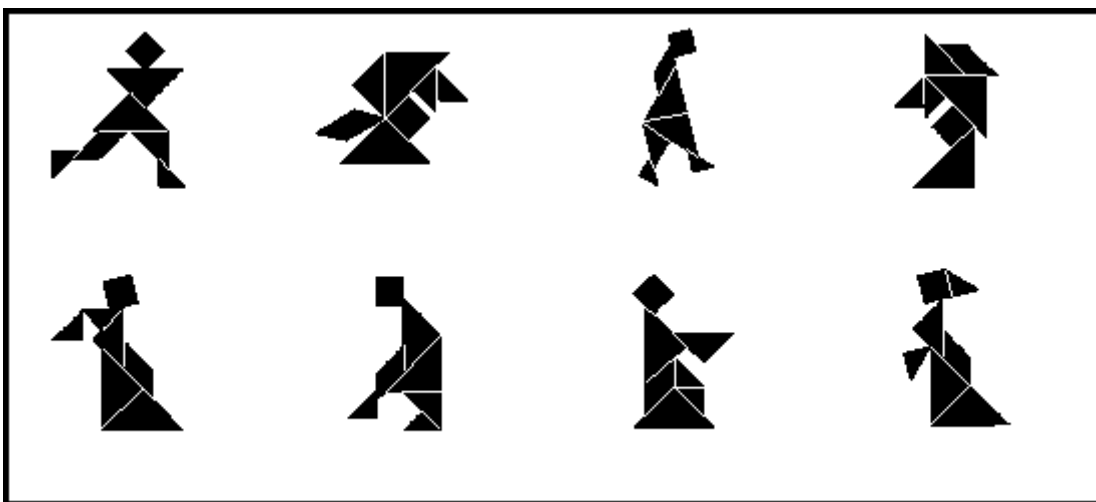

People

Exercise 13.2

2. (a) 8   (b) 10   (c) 16   (d) 12

3. (a) 10   (b) 12   (c) 10.5   (d) 9.2   (e) 9   (f) 10

4. (a) 12   (b) 16

6. (a) 6.5   (b) 9   (c) 9   (d) 10.5   (e) 8.5   (f) 10

7. (a) 500 m   (b)1000

8. 5 m   9. its perimeter
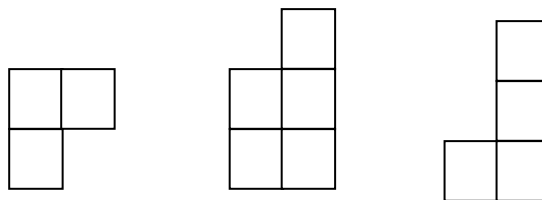
10. (a) 500 m   (b) 1500 m

Exercise 13.3

2. (a) 12   (b) 9   (c) 5   (d) 3   (e) 26

5.

Exercise 13.6

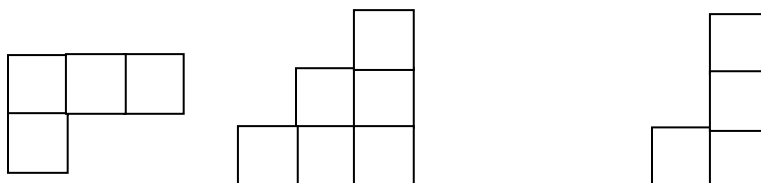4(a)   Top   Front   Right side

(b)   Top   Front   Right side

178

(c)   Top   Front   Right side